No. 803,701. PATENTED NOV. 7, 1905.

L. MÉGY.

VARIABLE SPEED GEARING.

APPLICATION FILED FEB. 12, 1902.

5 SHEETS—SHEET 1.

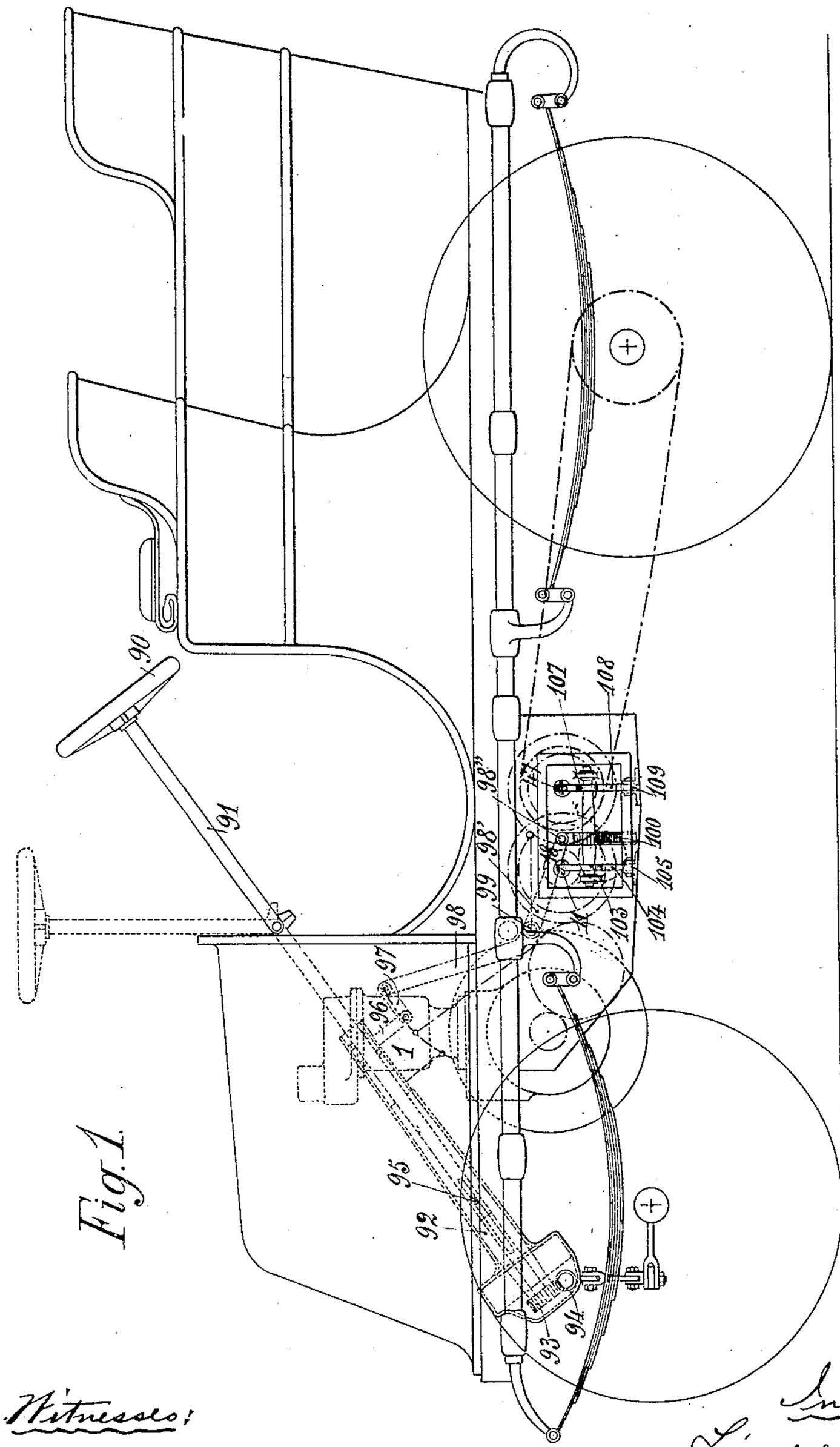

Fig. 1.

Witnesses:
Wm. B. Sterkam.
Chas. D. Lewer.

Inventor:
Léandre Mégy
by Philip Mason
his attorney

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VARIABLE SPEED GEARING.

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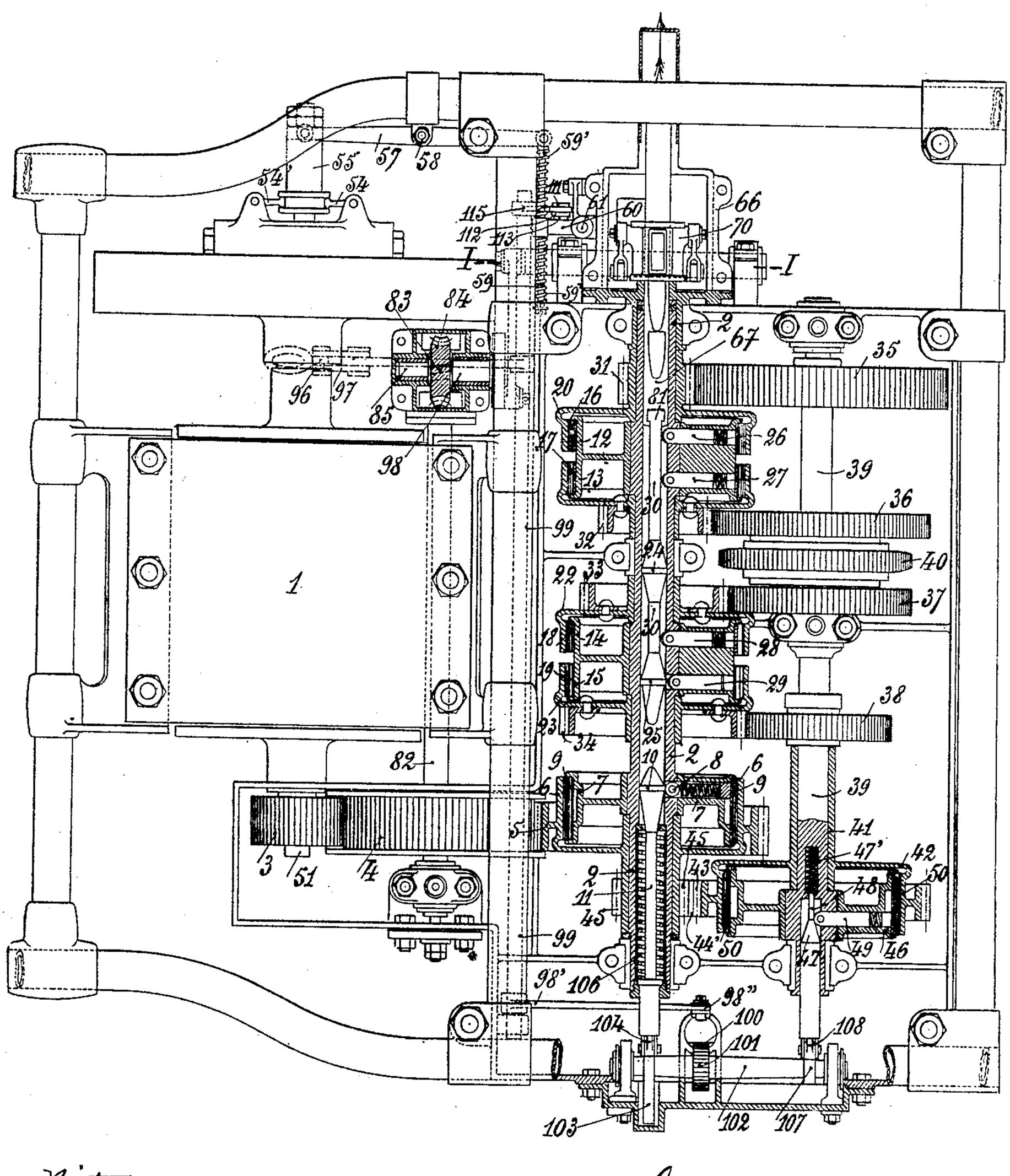
5 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

Inventor:

Léandre Mégy

by Philip Lauro

his attorney

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5 SHEETS—SHEET 3.

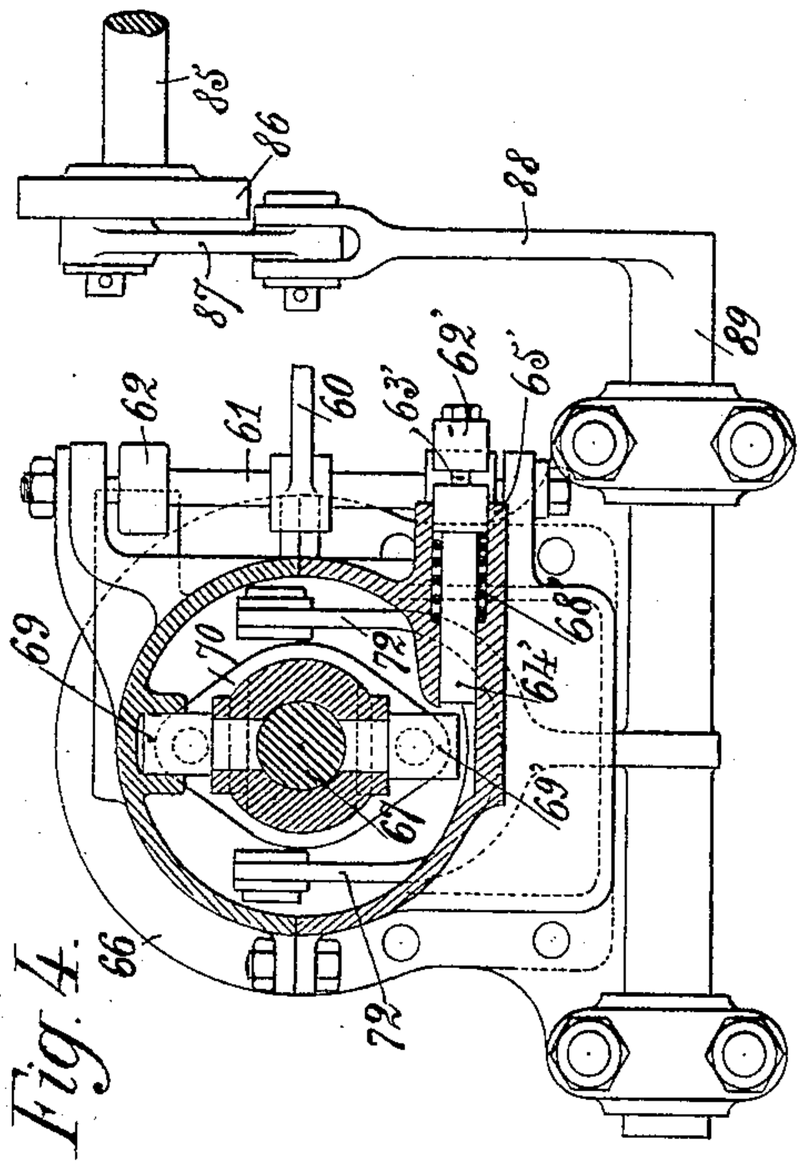

Fig. 4.

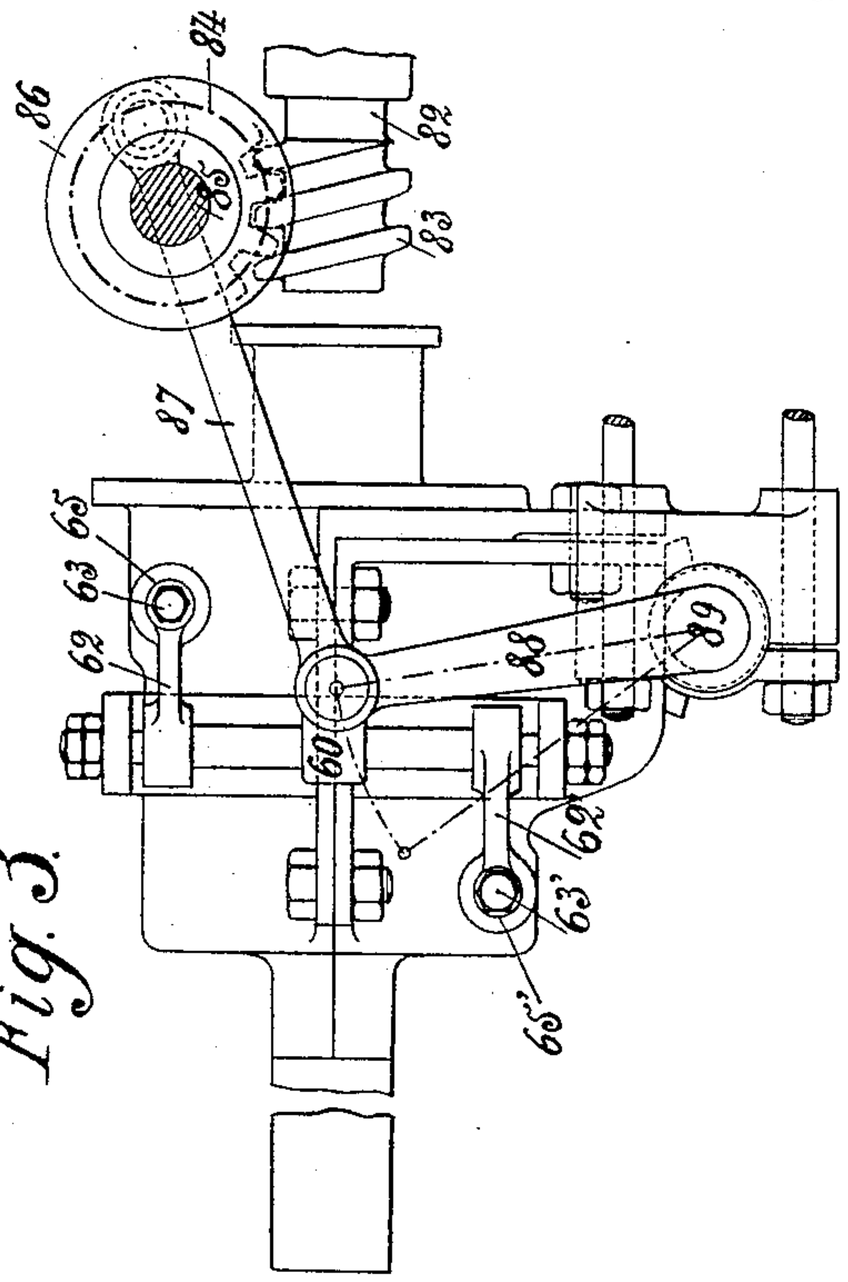

Fig. 3

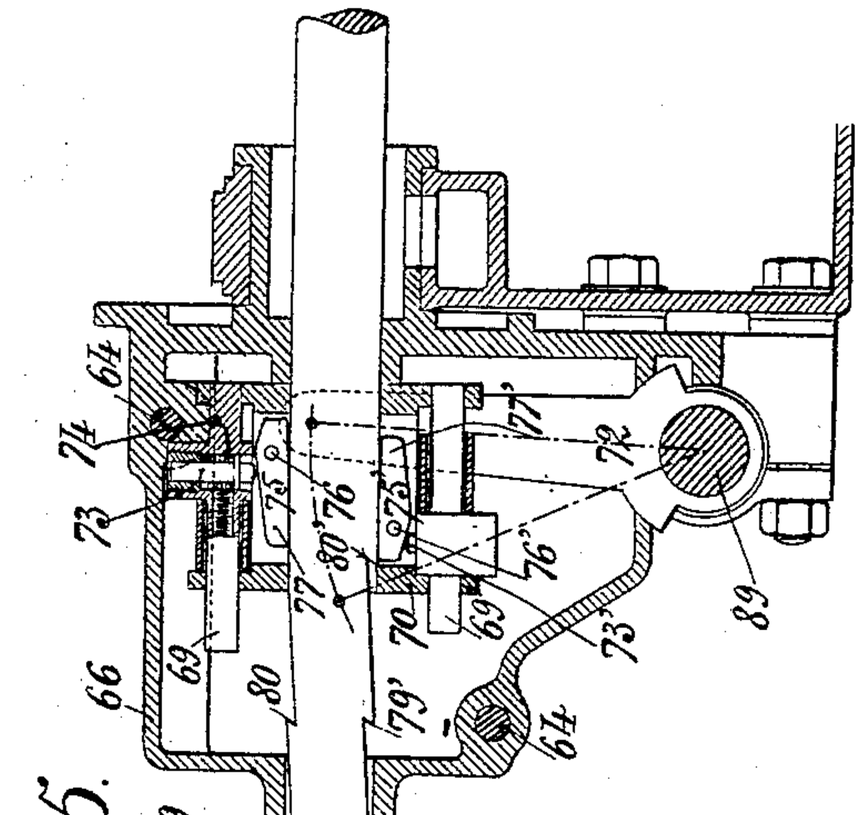

Fig. 5.

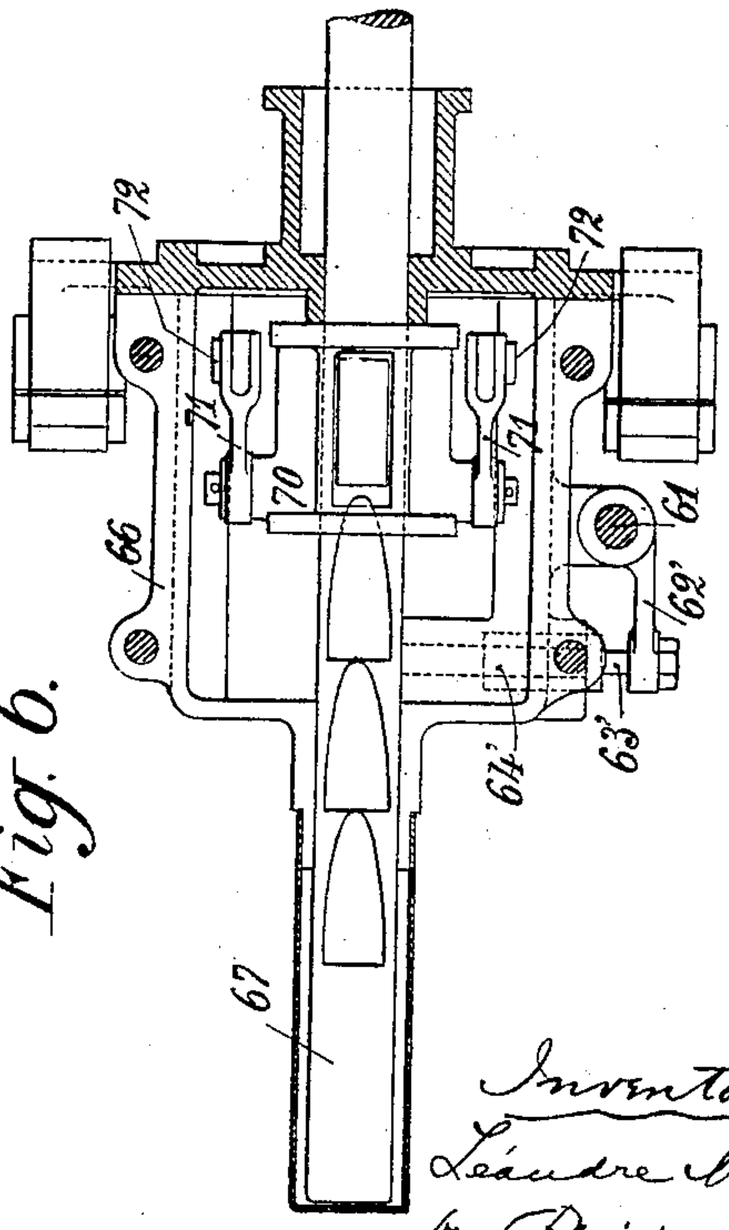

Fig. 6.

Witnesses:
Wm. B. Kerkam
Alex. Louck

Inventor:
Léandre Mégy
by Philip Mauro
his attorney

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L. MÉGY.

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5 SHEETS—SHEET 4.

Fig. 7.

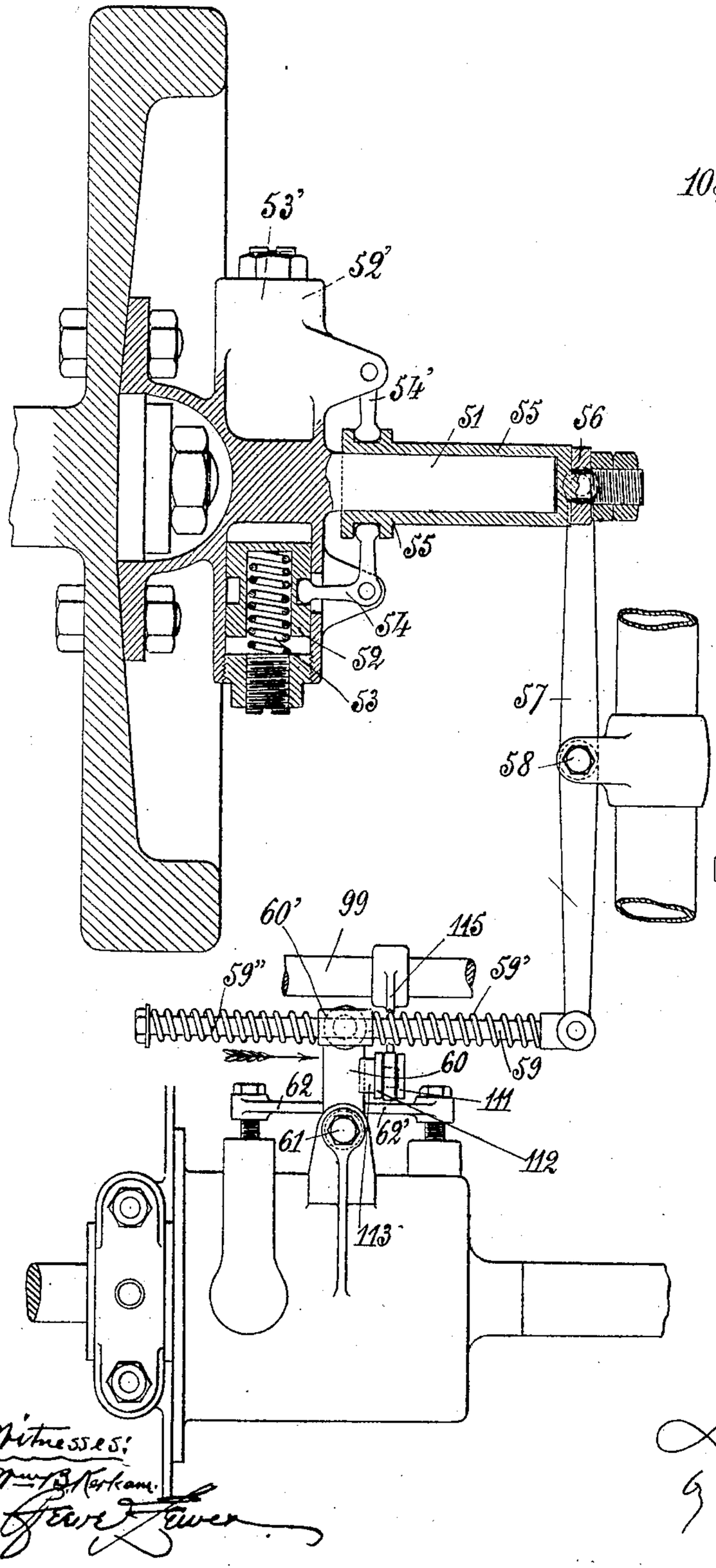


Fig. 9.

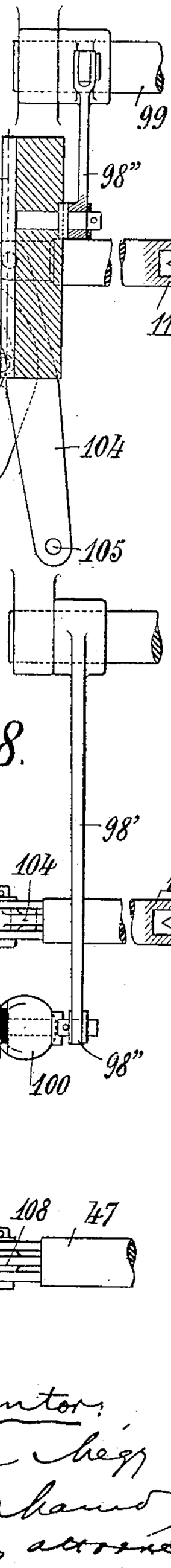


Fig. 8.

Witnesses:
Murray B. Markam.
Geo. L. Lewer.

Inventor:
Léandre Mégy
by Philip Hammond
his attorneys.

No. 803,701. PATENTED NOV. 7, 1905.

L. MÉGY.

VARIABLE SPEED GEARING.

APPLICATION FILED FEB. 12, 1902.

5 SHEETS—SHEET 5.

Fig. 12.

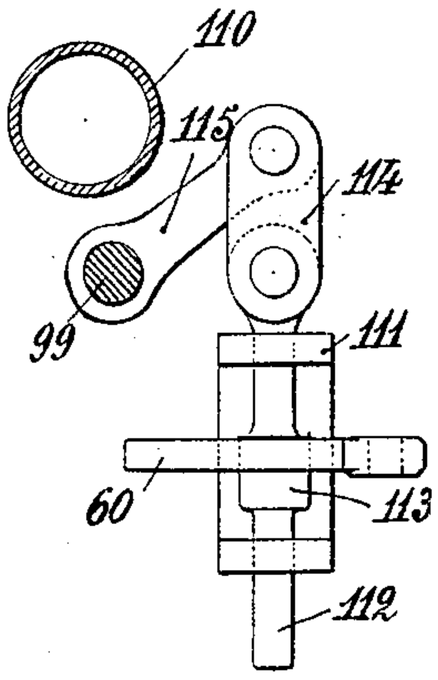


Fig. 11.

Fig. 13.

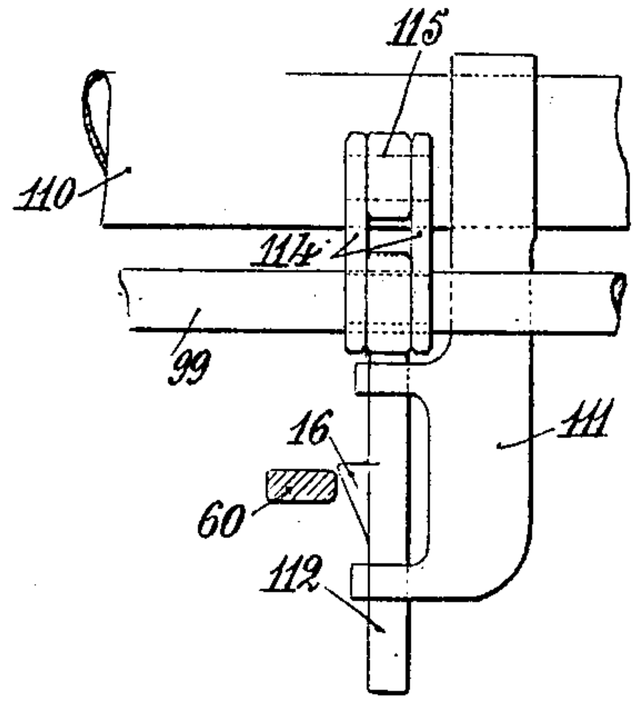
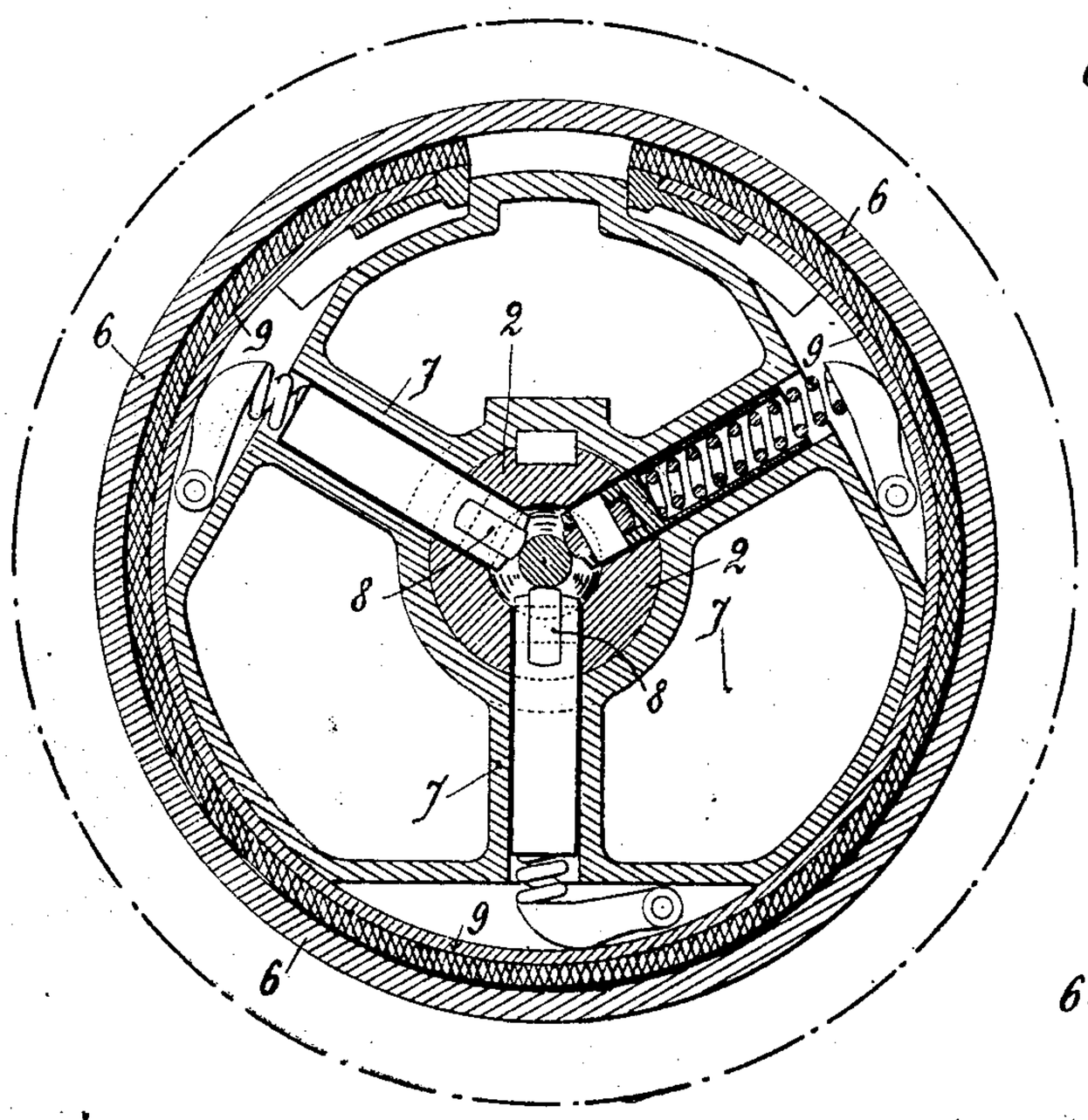
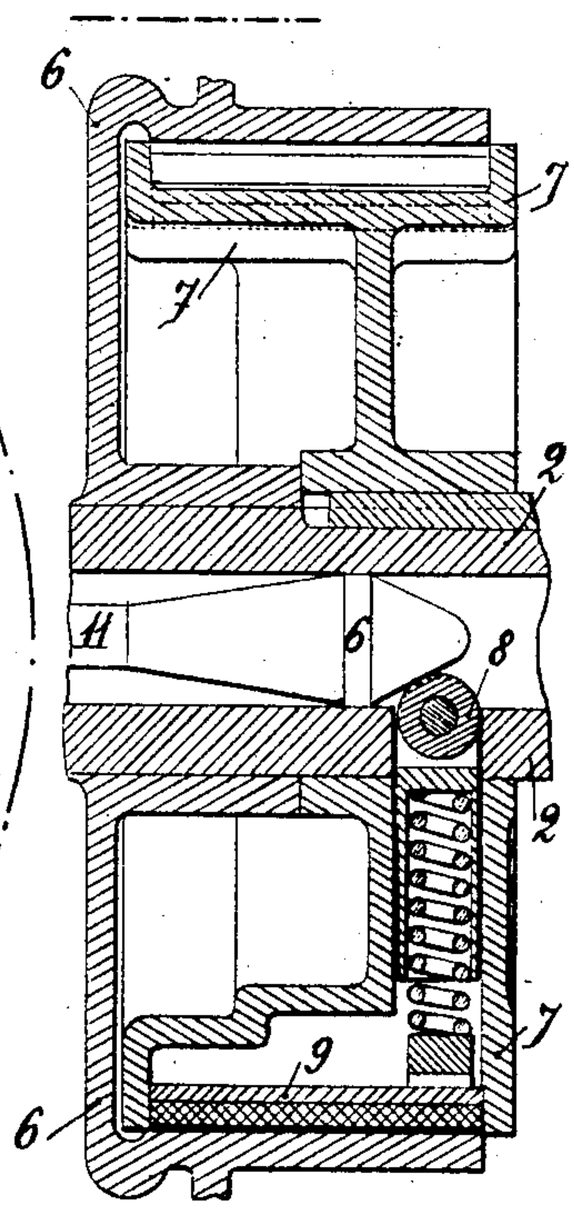


Fig. 10.





Witnesses:

Wm. B. Corkam.

Chas. L. Burns.

Inventor:

Léandre Mégy

by Thurston Brown

his attorney

UNITED STATES PATENT OFFICE.

LÉANDRE MÉGY, OF PARIS, FRANCE.

VARIABLE-SPEED GEARING.

No. 803,701. Specification of Letters Patent. Patented Nov. 7, 1905.

Application filed February 12, 1902. Serial No. 93,769.

To all whom it may concern:

Be it known that I, LÉANDRE MÉGY, civil engineer, of 3 Rue Fournial, city of Paris, Republic of France, (same being his post-office address,) have invented new and useful Improvements in and Connected with Variable-Speed Gearing, which improvements are fully set forth in the following specification.

The object of this invention is to enable all the operations connected with motor road-vehicles—that is to say, the starting, slackening, stopping, and backing and the change from a given rate of speed to a slower rate—to be performed by means of a single working lever or hand-wheel, which is substantially the steering-lever, the changes in the rate of speed, whether from a fast to a slower rate, or inversely, being, moreover, automatically promoted by the differences in the resistances encountered by the vehicle when left to itself. This object is effected by means of a collection of mechanical devices, two couplings or connecting-gears, one for starting, the other for backing, being actuated progressively and successively by conical spindles when the steering-wheel, which slides in its supporting-lever, is pushed forward or pulled backward, a series of gearings actuated by the projections of an indented spindle and corresponding to the different rates of speed being likewise operated in order to effect the transition from a high to a lower speed by pulling back the steering-wheel and for the change from a low to a higher speed, according to the variable resistance offered by the ground, by an auxiliary regulator for the motor, the action of which can always be nullified by the action of the directing hand-wheel. In Figures 1 to 13 of the accompanying drawings this collection of devices is shown as applied to a motor road-vehicle.

Fig. 1 is a general view of the vehicle shown diagrammatically and in elevation; Fig. 2, a general plan view of the mechanism with section through the axis of the coupling-boxes and coupling-sleeves. Fig. 3 is a side elevation of the box at the end of the indented spindle which actuates the spindle by which alterations of speed are effected. Fig. 4 is a section along the line I I in Fig. 2, taken transversely of the indented spindle and the slide-carriage that slides over it; Fig. 5, a vertical section of the same box through the axis of the indented spindle. Fig. 6 is a horizontal section of the same likewise through the axis. Fig. 7 is a horizontal section through the axis of the auxiliary regulator with plan of the box containing the indented spindle. Fig. 8 is a plan of the cam-shaft which actuates the spindles actuating the couplings by which the starting and backing are effected. Fig. 9 is a side elevation of this shaft with the larger cam. Figs. 10 and 11 illustrate one of the couplings in vertical and transverse section and in horizontal section. Figs. 12 and 13 show the arrangement by which the driver's hand-wheel actuates the indented spindle through which the changes of speed are effected.

The motion of the shaft of the motor 1 is transmitted to the hollow shaft 2 by the toothwheels 3, 4, and 5, the last-mentioned wheel forming part with the coupling-box 6 for the starting, the sleeve 7 of which, keyed to the shaft 2, is put into connection with the box when the symmetrical pins 8, which press against the coupling-spring 9, are removed by the projection 10 of a spindle 11, placed within the shaft 2 and actuated as explained later on. The shaft 2, which in this case receives the motion of the motor, has keyed to it a series of sleeve-couplings 12, 13, 14, and 15, which are only put into gear with the boxes 20 21 22 23 by the springs 16, 17, 18, and 19 (which surround them) when the symmetrical pins 26 26 27 27 or the pins 28 28 29 29, some of which are omitted for the sake of clearness, are forced outward by the conical projection 24 or 25. These cones are made integral with a spindle 30, capable of longitudinal displacement within the hollow shaft 2 and under the influence of mechanism described farther on.

The coupling-boxes 20 21 22 23 are loose on their respective sleeves as long as the corresponding cones of the spindle 30 have not brought, through the pins 28 29, the springs of these sleeves against the insides of the last mentioned. Each of these boxes forms part with a pinion having straight teeth. These pinions 31 32 33 34, whether rotating or stationary, are constantly in engagement, respectively, with the wheels 35 36 37 38, keyed to a shaft 39, parallel with the shaft 2. These wheels effect the alterations of speed, and their diameters, like those of the pinions with which they engage, are so arranged that the actuating of the wheel 35 by the motor produces the lowest rate of speed, of the wheel 36 a higher, of the wheel 37 a still higher, and of the wheel 38 the maximum rate of speed. The speed of rotation thus imparted to the shaft 39 by one of the pinions is transmitted by a sprocket-

chain running over a driving-wheel 40 to a differential gearing of any kind (not shown in the drawings) and arranged on the back axle. Finally, the sleeve 41 is loosely mounted on the shaft 39 and forms part with a coupling-box 42, which is made integrally with a toothed wheel 43, actuated, through the medium of an idle pinion 44, which serves as reversing-gear, by a pinion 45, keyed to the sleeve, which forms an extension of the coupling-box 6 for the starting. The coupling-sleeve 46, keyed to the shaft 39, is only actuated by the box 42, as in the previous cases, when the cone 47 of the spindle 48 comes between the pins 49 49, which then cause the expansion of the spring 50.

From the foregoing and observing that, in the case of Fig. 2, the position of the spindle 30 is that corresponding to the highest rate of speed, it will be understood that as long as the cone 10 remains between the pins of the coupling for the starting the motion of the motor will be transmitted to the shaft 2 and to the coupling-sleeves keyed to that shaft and that if the spindle 30 be pushed far enough in the direction of the arrow by any means whatever the cone 25 will remove from the highest-speed coupling and enter the coupling 14 for the third rate of speed. If the spindle be pushed farther, the cone 25 will effect an uncoupling of the gearing for the third rate of speed, while the cone 24 will effect the coupling of that for the second rate of speed. If the pushing be still continued, the cone 24 will disconnect the coupling for the second rate of speed and connect that for the lowest rate of speed. It will likewise be understood that if by any arrangement whatever the cone 10 of the spindle 11 be removed from the starting-coupling and at the same time the spindle 48 and its cone 47 are inserted in the reversing-coupling the shaft 2 will be stopped, the motion of the motor being directly transmitted, but in the reverse direction, to the shaft 39 by the box 6 and the gearings 45 44 43, the effect of which will be to back the vehicle. Thus it now remains to describe the arrangement which acts automatically on the spindle 30 so as to produce the effects just referred to, after which the arrangement for acting simultaneously on the spindles 11 and 48 will be described, and finally the manner in which these two arrangements are connected with the driver's hand-wheel will be described.

The mechanism for acting automatically on the spindle 30 under the action of a special regulator is illustrated in Fig. 7 on a larger scale than in Fig. 2. As will be seen from these figures, the shaft 51 of the motor actuates a special regulator consisting of the bodies 52 52′, which have a constant tendency under the influence of centrifugal force to compress the springs 53 53′ more or less in moving to a greater or lesser distance from the axis of rotation of the shaft 51. The motion of these bodies induces an oscillation of the square levers 54 54′, which according to the particular case cause the loosely-mounted sleeve 55 to slide outward or inward on the shaft 51, as also the collar 56, to which the lever 57, which oscillates around the fixed axis 58, is attached. The other end of the lever 57 actuates the rod 59 longitudinally, and so causes an oscillation of the lever 60, which is keyed to the vertical shaft 61, Fig. 4, and consequently of the two counter-levers 62 62′, mounted at an angle of one hundred and eighty degrees on the same shaft 61.

It should be observed that the lever 59 can slide freely in the shoulder-abutment 60′ of the lever 60. The oscillations of this lever are consequently caused by the compression or expansion of the springs 59′ 59″, confined, respectively, between the ends of the lever and the abutment. The object of this arrangement is to render the action of the regulator easier and in certain cases, as will be explained later on, to enable the lever to be influenced directly without deranging the regulator.

At the end of each of the counter-levers 62 62′ is a boss 63 63′, which acts on a cylindrical slide 64 64′, that enters an opening 65 65′ in the box 66, containing the indented spindle 67, which forms an extension of and is attached to the spindle 30, which effects the changes of speed.

A spring 68, (or 68′,) situated in a recess between the sides of the opening 65 and the slide 64, constantly acts in opposition to the movement of the slide in entering the box.

When the lever 60 oscillates in either direction under the action of the regulator, the slide 64 or 64′ comes with its end in the path of a sliding piece 69, (or 69′,) moving in and carried by a sleeve 70, which is reciprocated on the indented rod 67 by the connecting-rods 71 71, actuated by the fork 72 by means of a device that will be described later on.

The sliding pieces 69 69′ (the one, 69, shown partly in section, the other, 69′, in elevation, in Fig. 5) carry pins 73 73′, which are pressed by springs 74 74′, (the latter not shown,) confined between these pins and the sides of their lodgments in the sliding pieces, against the pawls 75 75′, capable of swinging around axes 76 76′, held by their ends in the sleeve 70, which consequently carries them along in its regular reciprocating motion.

It follows that the pins 73 73′, usually reciprocating with the slide-carriages 69 69′ by the motion of the sleeve, can, nevertheless, be displaced on the pawls, which constantly take part in the motion of this sleeve when the slide 64 or the slide 64′, entering, as has been stated, into the box 66 under the action of the regulator, stops the carriage 69 or 69′ a little before the end of its forward course, which is no longer carried along by the sleeve,

but slides on it freely up to the end of the forward half-oscillation, being, however, carried back with it, there being no hindrance in this direction during the return half-oscillation. The effect of this displacement is that when the pin in consequence of its stopping thus passes over the nose or projection of the corresponding pawl this projection 77 or 77′ is forced into one of the upper notches 78 79 80 or lower notches 78′ 79′ 80′. When, on the contrary, the slide-carriage not having been displaced, the pin acts on the back part of the pawl, the nose of the said pawl remains raised and the pawl slides over the indented spindle without displacing it. As shown in Fig. 5, these notches are arranged in such a manner that when the pawl 75 acts the rod 67 is pushed in the direction of the arrow *f*, and when the lower pawl 75′ acts under the influence of the lower slide the rod 67 is pushed in the direction of the arrow *f*′.

The motion connected with the entrance or withdrawal of the rod 67 is communicated to the spindle 30 for changing the speed. This spindle, in fact, forms an extension of the rod 67, to the end of which it is attached by a connecting arrangement 81 of any kind which will allow of its rotating on its own axis while controlled by the rod 67, which, as will be seen, cannot be displaced except in the direction of its axis.

As to the oscillating motion of the sleeve 70, it is effected by means of the following arrangement: The intermediate shaft 82, which carries the tooth-wheel 4, is extended by an endless screw 83, which actuates a tooth-wheel 84, mounted on a shaft 85, carrying at one of its ends a plate 86, which it rotates. To this plate a rod 87 is attached, which, by means of the lever 88, shaft 89, and forked counter-lever 72, imparts to the sleeve 70 the reciprocating motion mentioned above through the medium of the connecting-rods 71. It will be seen that the speed of this motion, which lasts as long as the motor is acting, depends entirely upon the speed of the intermediate shaft 82, which in turn depends upon that of motor 1.

From what is stated above and by referring to Figs. 2, 5, and 7 the effect on the spindle 30 of the automatic action which produces the change of speed necessitated by the variations in the resistances encountered by the vehicle will be understood. Supposing, in fact, that the vehicle, which is moving, has just taken up the first rate of speed (this is the case in Fig. 5) and an equilibrium has been established between the resistance of the ground and the power of the motor, this state of things implies the putting of the couplings 12 20 into action and the insertion of the cone 24 between the pins of this coupling, the notch 80′ is at the height of the starting-point for the pawl 75′, which does not act on it, the lever 60 having its normal position perpendicularly to the axis of the indented rod. If at this moment the vehicle should be traveling downhill or for any reason the resistance should be diminished, the speed of the motor will increase, the radial bodies 52 52′ will move away from the axis of rotation, and the lever 60, as previously explained, will incline in the direction of the arrow, Fig. 7. The lower slide 64′ engages in the box 66, stops, at the end of the second forward oscillation, the slide-carriage 69′ and its pin 73′, which, passing from the back part of the pawl 75′ to the front part 77′, forces it during the return half-oscillation into the notch 80′. The indented rod and the spindle 30 are consequently carried in the direction of the arrow *f*′ to the extent represented by a half-oscillation. The cone 24 of the spindle, carried along to an equivalent extent in the same direction, disconnects the slow-rate coupling and connects the third-speed coupling. (The distance between the indentations, always shorter than the stroke of the sleeve 70, is so calculated that the advance of the pawl to the extent of one notch corresponds to the engagement of one of the cones 24 25 in a higher-rate-speed coupling.) If this increase of speed is sufficient for reëstablishing the equilibrium between the power and the resistance, the regulator will return to its normal position, returning the lever 60, the slide 64′ will be withdrawn from the path of the slide-carriage, which has been brought back to its normal position by striking against the bottom of the box 66 at the end of the last return oscillation, will have replaced the pin 73′ on the back part of the pawl 75′, and consequently will raise this pawl. The third-rate-of-speed coupling will thus remain in position, reëstablishing to this rate of speed an exact equilibrium between the power and the resistance. If, on the contrary, the excessive speed of the motor continues or increases and the bodies 52 52′ remain in their new position or are forced farther apart, the slide 64′ and the slide-carriage 69′ impart to the pawl 75′ by engagement with the indentations 79′ a fresh push of the indented rod, and so on until the indentations are exhausted, if the excessive speed of the machine increases or continues. If, all the indentations having been exhausted, the motor continues at the excessive speed which has caused the successive advancement of the rod 67, the governor of the motor (not shown) will come into action and limit the speed to its highest normal rate. If at this moment, and contrarily to what has just been supposed, the resistance to the running of the vehicle increases owing to an ascent or any other cause, the normal work of the motor being inferior to the increased resistance, the speed of the said motor should diminish. The bodies 52 52′ leave their actual position and come nearer together, acting in the contrary sense to that in which

they acted just previously, and this time, through the upper slide 64 and the other pawl 75, will act on the couplings of successively-decreasing speed until the regulator has resumed its normal speed. If it fails to do so, the resistance must be greater than the power and the motor will be brought to a standstill.

It will be clearly seen that when one of the pawls acts on one of the sides of the indented rod the nose of the other pawl is raised and does not act on the opposite side.

It now remains, in referring to the general views, Figs. 1 and 2, and to the detailed views, Figs. 8 and 9, to consider how the coupling-spindles for the starting and backing can be operated as desired by means of the driver's hand-wheel 90. The steering movement is first effected through this hand-wheel and the rod 91, which supports it, by imparting an angular rotatory motion from right to left and inversely to the tube 92, to the lower end of which the pinion 93 is keyed, which engages with the rack 94, acting on the fore wheels of the vehicle. The transmission of this angular motion from the rod to the tube 92 is effected through the medium of a pin 95, fixed to the rod 91 and sliding freely in two diametrically opposite grooves formed in the tube. By pulling up the steering-wheel—that is to say, by pulling it toward him—the driver imparts a movement of penetration to the spindle 11 of the starting-coupling through the medium of the rod 91, which in being rectilineally displaced carries along the lever 96 and causes, through the connecting-rod 97 and the lever 98, a rotation of the shaft 99. On the other end of this shaft there is keyed a lever 98′, which through the connecting-rod 98″, linked to the rack 100, actuates the pinion 101, Fig. 8, and consequently causes a rotary motion of the cam-shaft 102. The first effect of this motion is that by means of the cam 103 the lever 104, which turns around the fixed point 105, makes the spindle 11 enter farther in the coupling against the action of the spring 106, which tends to keep the cone 10 between the pins 8. The coupling 6 7 is thus completely disconnected. The second effect of this motion is that through the passage of the cam 107 behind the roller of the lever 108, which turns around the fixed point 109 and is linked, on the other hand, to the end of the conical spindle 47, this spindle enters the coupling 42 to 46 for reversing the motion of the vehicle against the action of the spring 47′.

The effects of the insertion of the spindle are successive, so that at the first displacement a partial disconnection of the starting-coupling and a corresponding slowing of the vehicle is produced. By continuing the insertion of the spindle the first coupling for starting is completely disconnected and the reversing-coupling is brought into play, which diminishes the speed acquired, terminates it, and finally runs back the vehicle.

By leaving to itself and gently pushing the hand-wheel 90 the reverse effect is produced. The coupling-cam 107 for the running backward of the vehicle in moving away disengages the coupling, and the backward movement ceases. Then comes the turn of the coupling for the forward movement, the spring 9 employed in connection with which expands progressively in proportion as the cam moves away and the coupling acts gradually. The vehicle starts gently and quickly resumes the speed corresponding to the resistance of the ground.

The preceding explanations show that the direction, stopping at will, and the backward motion are all exclusively dependent upon the operating hand-wheel.

Elsewhere we have shown how the changes of speed were effected automatically under the action of the motor.

We will now show how upon the hand-wheel being pulled toward the driver, acting thus on the starting-coupling in order to produce a slackening effect, the couplings for the changes of speed are actuated at the same time. Those couplings, as stated, are influenced by the displacing of the spindle 30, and these displacements effected by the regulator are transmitted by the oscillations of the lever 60. This lever may be actuated directly by the hand-wheel, but in one direction only. The arrangement by means of which this connection is effected is shown in Figs. 12 and 13 in end view and side elevation. To the frame 110 a suspended chair 111 is fixed, by which the displacements of a lever 112, carrying a cam 113, are guided. This lever slides in front of the lever 60. It is attached by one of its ends to a connecting-rod 114, which is linked to a lever 115, keyed to the shaft 99. It will thus be easily seen, as well in Figs. 12 and 13 as in Fig. 7, that at every movement of the shaft 99 in the direction of the arrow a motion corresponding to the tractional action of the hand-wheel there will be a corresponding downward movement of the cam 113, which, putting the lever 60 aside, will force in the slide 64′, causing the spindle, as explained, to change a given speed for a slower one. The slackening induced by the progressive disconnection of the coupling for the starting is thus made to correspond with the changes of speed, and as the cam 113 is arranged so that the transition to the coupling for the lowest rate of speed corresponds with the disconnection of the coupling for the starting it follows that when it starts again the vehicle will always go ahead at the minimum speed.

The advantages of the collection of devices just described are due in the first place to the use in connection with the changes of speed and the starting and reversing gears of the

described couplings, which render all the movements of the vehicle easy and gradual, a result which could not be secured without their assistance. In the second place they enable the vehicle to be put automatically at the requisite speed, allowing the motor to furnish the maximum work corresponding to the sum of the variable resistance of the road; but, a very important point, they prevent the driver either through inattention or inexperience from putting his vehicle at a greater speed than that at which the motor can act according to the state of the road. Whether he be a novice or a man of experience the driver will not need to trouble himself in regard to a change of speed. The motor itself will push the spindle for this purpose into the coupling for the greatest speed at which it can work; but if the driver is unable to go beyond this extreme limit we have seen that by simply pulling toward him the hand-wheel he can run successively through all the lower rates of speed until a stoppage is effected and even until the vehicle is run backward, like a rider who pulls the reins of his mount slightly and gradually when wishing to check or stop him, and we have seen that this action is exercised simultaneously on the speed-change gearings and on the starting-coupling. A remarkable effect of this arrangement is that with a vehicle furnished with these change-of-speed gearings or coupling it is possible to descend a sharp incline at a low rate of speed, lower than that of the gear of minimum speed, and diminishing as the incline becomes sharper. In order to effect this, it is only necessary, the vehicle having reached the top of this ascent at any rate of speed, for the driver to pull the hand-wheel toward him until a stoppage is effected. In this way he disconnects the starting-coupling without connecting the reversing-coupling, and consequently releases the two shafts 2 and 39; but as the vehicle starts rapidly down the incline the vehicle-wheels, to which motion has before been imparted to propel the vehicle, now act to impart motion to shaft 39, which in turn, through slow-speed gears 35 and 31, sleeve-coupling 12, and box 20, by reason of reversal of the driving direction, imparts a very rapid rotation to shaft 2, such that under the action of centrifugal force the pins 27, 28, 29, and 8 will fly out and the springs 17, 18, 19, and 9 will be pressed against their respective boxes with frictional engagement, tending to rotate said boxes at the same rate of speed as shaft 2; but it is impossible for boxes 21, 22, and 23 to rotate at the speed imparted to shaft 2 by shaft 39 through gears 35 and 31, because the proportionate sizes of gears 39 and 36, connecting box 21 with shaft 39, differ from the proportionate sizes of gears 35 and 31, the same being furthermore true of gears 33 and 37 and 34 and 38. It will therefore be seen that the tendency of the friction exerted by the clutch arrangement will be to lock the two shafts 39 and 2 together against rotation, the effect produced being to oppose frictional resistance to the rotation of shaft 39, automatically moderating it and slackening the speed of the vehicle. This action will be assisted by the frictional engagement of spring 9 with box 6.

Having now fully described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a motor road-vehicle, driving mechanism therefor; a plurality of gearings for imparting different speeds respectively to the vehicle; motor-driven means for throwing the gearings into operation; and means automatically operated by changes in the speed of the driving mechanism for controlling the action of the motor-driven means in throwing the gearings into operation.

2. In a motor road-vehicle, driving mechanism therefor; a plurality of gearings for imparting different speeds respectively to the vehicle; motor-driven means for throwing the gearings into operation; and centrifugal mechanism driven by the driving mechanism and operating by centrifugal force to automatically control the action of the motor-driven means in throwing the gearings into operation.

3. In a motor road-vehicle, driving mechanism therefor; a plurality of gearings each for imparting a different speed from the driving mechanism to the vehicle; controlling means for throwing said gearings into operation; motor-driven means for actuating said gearing-controlling means; connections through which the motor-driven actuating means operate the gearing-controlling means to throw a higher or a lower speed gearing into action; and means automatically operated by changes in the speed of the driving mechanism for throwing said connections into and out of operation.

4. In a motor road-vehicle, driving mechanism therefor; a plurality of gearings each for imparting a different speed from the driving mechanism to the vehicle; controlling means for throwing said gearings into operation; motor-driven means for actuating said gearing-controlling means; connections through which the motor-driven actuating means operate the gearing-controlling means to throw a higher or a lower speed gearing into action; and centrifugal mechanism driven by the driving mechanism and operating by centrifugal force to automatically throw said connections into and out of operation.

5. In a motor road-vehicle, driving mechanism therefor; a plurality of gearings each for imparting a different speed from the driving mechanism to the vehicle; controlling means for throwing said gearings into operation; continuously-operating motor-driven means

for actuating said gearing-controlling means; connections through which the motor-driven actuating means operate the gearing-controlling means to throw a higher or a lower speed gearing into action; and means automatically operated by changes in the speed of the driving mechanism for intermittently throwing said connections into operation.

6. In a motor road-vehicle, driving mechanism therefor; a plurality of gearings each for imparting a different speed from the driving mechanism to the vehicle; controlling means for throwing said gearings into operation comprising a toothed rod; a sleeve about said rod; connections for continuously oscillating said sleeve from the driving mechanism; two pawls mounted on the sleeve adapted to engage the teeth on the rod to impart movement thereto in opposite directions respectively; movable stops for throwing the pawls into position to engage the teeth on the rod to move the latter with the sleeve; and centrifugal mechanism driven by the driving mechanism and acting by centrifugal force to automatically move said stops into and out of their active positions.

7. In a motor road-vehicle, driving mechanism therefor; a plurality of gearings each for imparting a different speed from the driving mechanism to the vehicle; controlling means for throwing said gearings into operation comprising a toothed rod, a sleeve about said rod, connections for continuously oscillating said sleeve from the driving mechanism, two pawls mounted on the sleeve adapted to engage the teeth on the rod to impart movement thereto in opposite directions respectively, movable stops for throwing the pawls into position to engage the teeth on the rod to move the latter with the sleeve; centrifugal mechanism driven by the driving mechanism and acting by centrifugal force to automatically move said stops into and out of their active positions; and means controlled by the operator for moving one of said stops into active position independently of the action of the centrifugal mechanism to cause the corresponding pawl to move the rod to throw a higher-speed gearing out of operation and a lower-speed gearing into operation.

8. In a motor road-vehicle, driving mechanism therefor; a plurality of gearings for imparting different speeds respectively from the driving mechanism to the vehicle; a clutch for connecting the driving mechanism with and disconnecting it from the gearings; means under control of the operator for throwing said clutch to its inactive position and for simultaneously causing the lowest-speed gearing to be thrown into action.

9. In a motor road-vehicle, driving mechanism, a driving-shaft from which the vehicle is driven, a clutch-shaft adapted to be connected to and disconnected from the driving mechanism at the will of the operator, a plurality of gearings each for imparting a different speed from said clutch-shaft to the driving-shaft and each comprising a gear-wheel loose on the clutch-shaft when the corresponding gearing is inactive, friction-clutches on the clutch-shaft one for connecting each gear-wheel to said shaft each clutch comprising outwardly or radially movable members for forcing the friction-surfaces into contact, and means for forcing said members outwardly to throw any clutch and the corresponding gearing into action.

10. In a motor road-vehicle, driving mechanism, a driving-shaft from which the vehicle is driven, a clutch-shaft adapted to be connected to and disconnected from the driving mechanism at the will of the operator, a plurality of gearings each for imparting a different speed from said clutch-shaft to the driving-shaft and each comprising a gear-wheel fast on the driving-shaft with a gear-wheel loose on the clutch-shaft when the corresponding gearing is inactive, friction-clutches on the clutch-shaft one for connecting each clutch-shaft gear-wheel to said shaft, friction-clutches on the clutch-shaft one for connecting each gear-wheel to said shaft each clutch comprising outwardly or radially movable members for forcing the friction-surfaces into contact, and means for forcing said members outwardly to throw any clutch and the corresponding gearing into action.

11. In a motor-vehicle, the combination with driving mechanism therefor; of connections from said driving mechanism for imparting forward or backward movements to the vehicle, and means for decreasing the speed of the vehicle all under control of a single operating device accessible to the operator; and automatically-operating means for varying the speed of the vehicle.

12. In a motor road-vehicle, driving mechanism therefor; a plurality of gearings each for imparting a different speed of forward movement from the driving mechanism to the vehicle; gearing for imparting backward movement from the driving mechanism to the vehicle; friction-clutches one between the driving mechanism and the forward-movement gearings and another between said mechanism and the backward-movement gearing; a controlling device accessible to the operator; and connections actuated upon progressive movement of said controlling device in one direction for bringing the forward-movement gearings successively into operation until the lowest-speed gearing is reached, and then throwing the clutch to the forward-movement gearings out of operation and the clutch to the backward-movement gearing into operation.

13. In a motor road-vehicle, driving mechanism therefor; a driving-shaft from which the vehicle is driven, a clutch-shaft, a plurality of gearings each for imparting a differ-

ent speed of movement from said clutch-shaft to the driving-shaft and each comprising a gear-wheel on the clutch-shaft, clutches one for connecting each gear-wheel to the shaft, a clutch for connecting the driving mechanism with said clutch-shaft; a controlling device accessible to the operator and connections actuated upon progressive movement of said controlling device in one direction for bringing the gearings successively into operation until the lowest-speed gearing is reached and for then operating the clutch for disconnecting the driving mechanism from the gearings.

14. In a motor road-vehicle, driving mechanism, a driving-shaft from which the vehicle is driven, an intermediate shaft, a plurality of gearings each for imparting a different speed of rotation from said intermediate shaft to the driving-shaft, a clutch controlling the operation of the intermediate shaft by the driving mechanism, a controlling device accessible to the operator and connections actuated upon progressive movement of said controlling device in one direction for bringing the gearings successively into operation until the lowest-speed gearing is reached and for then operating the clutch to disconnect the driving mechanism and the intermediate shaft.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LÉANDRE MÉGY.

Witnesses:

DOUMÉ CASALONGA,

EDWARD P. MACLEAN.