No. 650,516. Patented May 29, 1900.

E. E. MOLAS, E. J. LAMIELLE & H. F. A. TESSIER.

POWER DRIVEN VEHICLE.

(Application filed Aug. 16, 1899.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 2.

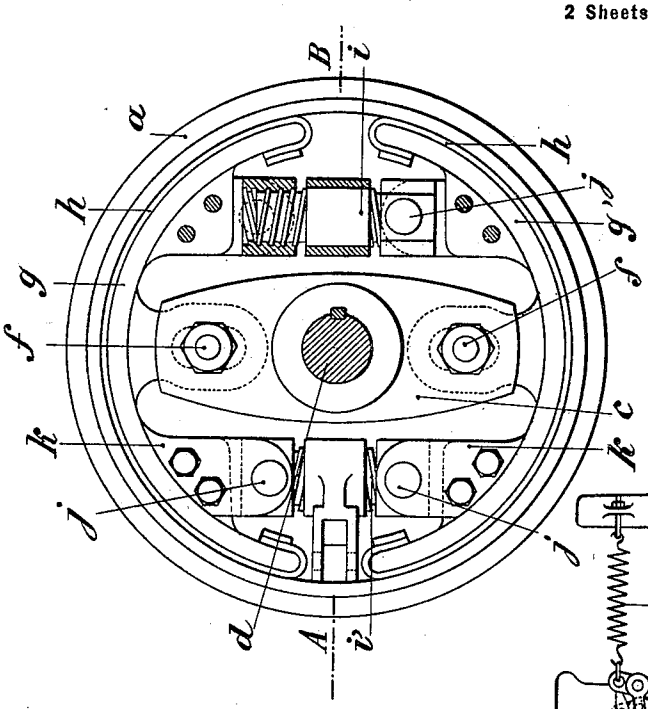
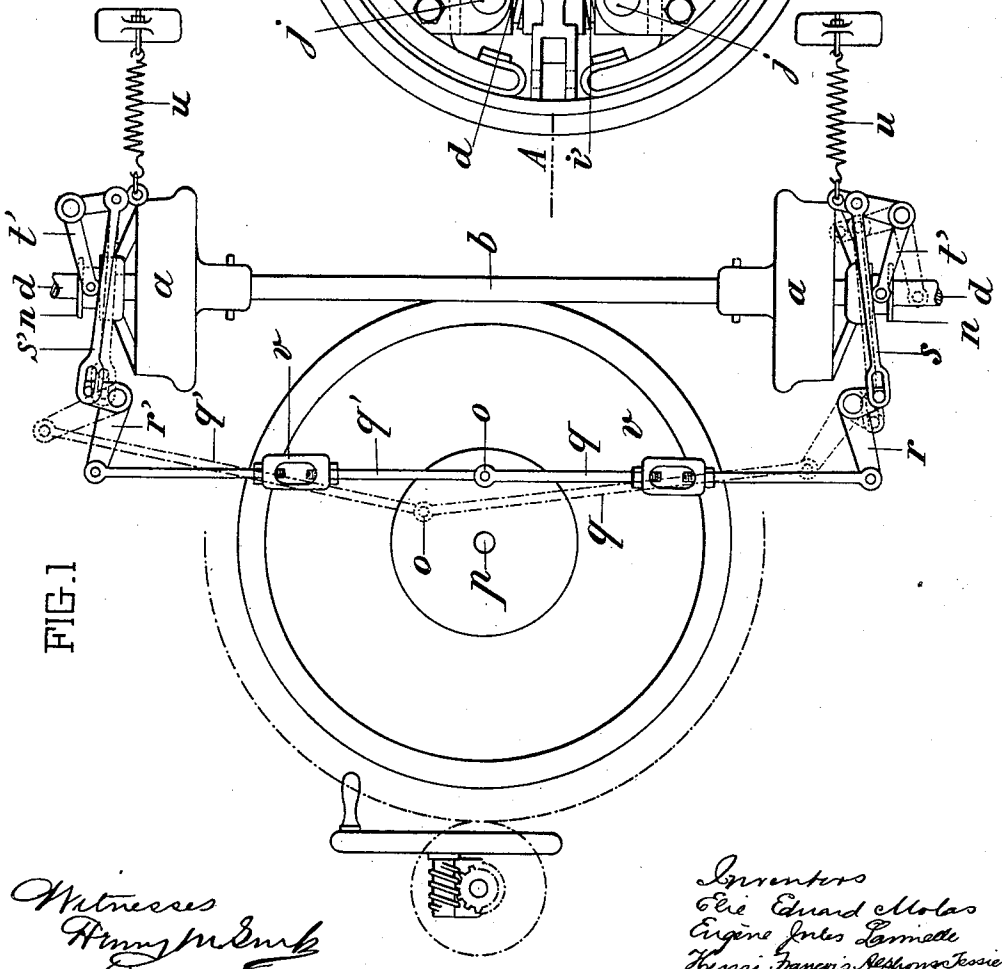


FIG. 1



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FIG. 4

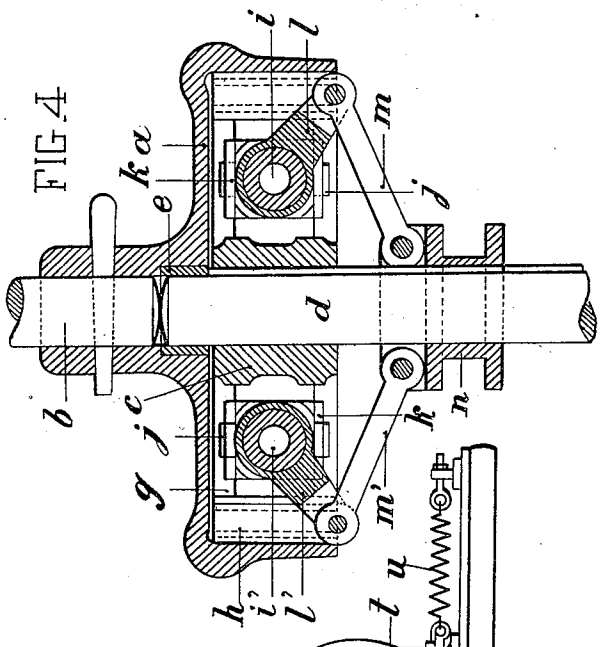
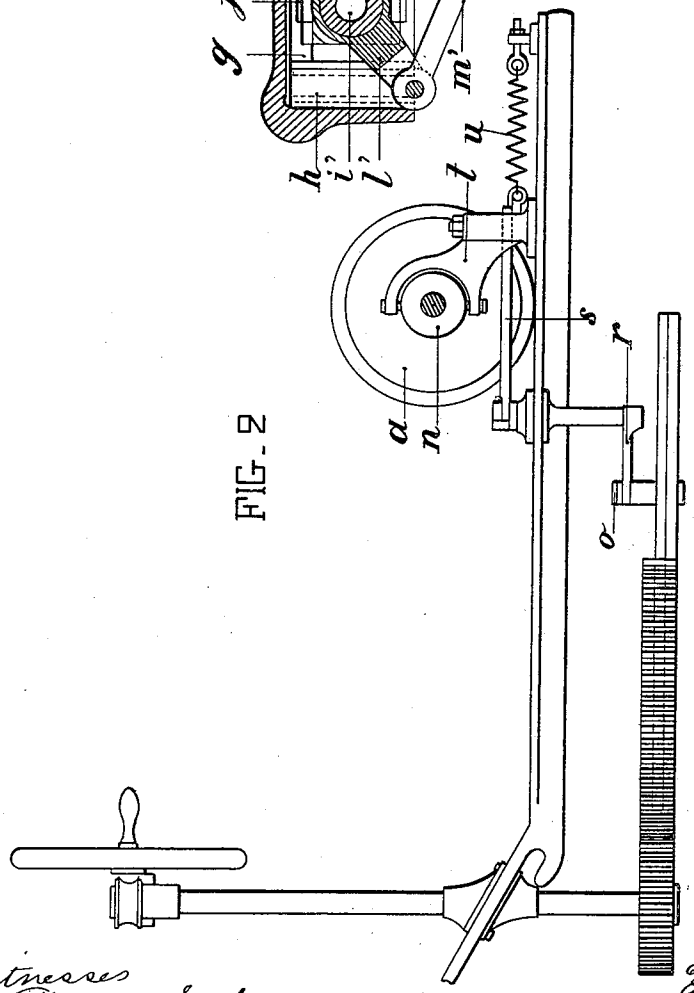


FIG. 2



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ELIE EDOUARD MOLAS, EUGÈNE JULES LAMIELLE, AND HENRI FRANÇOIS ALPHONSE TESSIER, OF PARIS, FRANCE.

POWER-DRIVEN VEHICLE.

SPECIFICATION forming part of Letters Patent No. 650,516, dated May 29, 1900.

Application filed August 16, 1899. Serial No. 727,370. (No model.)

To all whom it may concern:

Be it known that we, ELIE EDOUARD MOLAS, EUGÈNE JULES LAMIELLE, and HENRI FRANÇOIS ALPHONSE TESSIER, of 45 Rue du Chemin Vert, in the city of Paris, Republic of France, have invented Friction-Gear for Actuating the Driving-Wheels of Power-Driven Vehicles, of which the following is a full, clear, and exact description.

This invention relates to friction-gear for actuating the driving-wheels of power-driven vehicles, the action of said gear being exclusively dependent on the steering of the vehicle, so that so long as the vehicle is traveling in a straight line motion will under all circumstances be transmitted equally to the two driving-wheels, while when the vehicle is traveling in a curve motion will be transmitted to the two wheels proportionately to the radii of the curves in which they travel, so that a constant balance of the power transmitted to and utilized by each wheel will be maintained.

Reference is to be had to the accompanying drawings, wherein—

Figure 1 represents a plan, and Fig. 2 a side elevation, of the general arrangement of the apparatus mounted on the swiveling fore-carriage of an automotor vehicle. Fig. 3 shows separately, upon a larger scale, an internal face view of one of the friction-couplings. Fig. 4 is a transverse section of the same on line A B, Fig. 3.

The same letters of reference denote like parts in the several figures.

The friction-gear of this invention is intended to replace the ordinary balance-gear, consisting generally of toothed gearing, which although it automatically distributes the driving motion to the two wheels proportionately to the radii of the curves in which they happen to be running can only do so provided the frictional resistances of the wheels upon the ground be equal. Therefore when running in a straight line an inequality in the distribution of the force will take place should the resistances be unequal, the effect being that should one wheel encounter an obstacle—a stone, for instance—the power transmitted to that wheel will be decreased, (just when it needs to be increased, since an obstacle has to be overcome,) while that transmitted to the other wheel will be correspondingly increased, and thereby tend to cause the vehicle to describe a circle about the point of contact of the blocked wheel as a center, this tendency being only resisted by the steering-gear, which is liable to become strained by its frequent recurrence, or, again, mounting the slope of a carriage-entrance across the footpath or other upward slope at an oblique angle is rendered more difficult, as the wheel which first encounters the obstacle at once receives less power and the balance-gear thus tends to cause both wheels to surmount the obstacle at once. It will thus be seen that the numerous accidents to mechanically-operated vehicles provided with ordinary balance-gear are mainly due to the alternations of the driving power transmitted to the two wheels according to the different resistances presented by the ground over which they travel, such alternations being always in inverse ratio to the needs of the case when traveling in a straight line. In order to remedy these and other objections—such as the breaking of teeth, the seizing of parts, &c.—we have devised a gear having no toothed wheels and in which the action is solely dependent on the steering-gear, so that the wheels will be equally driven so long as the vehicle is running in a straight line. When the vehicle is steered to right or left, the wheel which has to run on the curve of smaller radius is uncoupled to the extent necessary to permit of its slower motion, while the other wheel is coupled up more tightly, so as to compensate for the difference of power utilized, the uncoupling being effected gradually and proportionately to the difference of length of the ground traveled over by the two wheels.

The friction-gear consists, essentially, of a pair of friction-couplings enabling a progressive frictional engagement within wide limits. Each coupling comprises a drum *a*, Figs. 3 and 4, keyed on the driving-shaft or upon an intermediate shaft *b*, by which power is transmitted either directly to the driving-wheels or to the pinions actuating the same. The drum *a* contains the movable parts by means of which the progressive frictional engagement is obtained and comprise a boss *c*, keyed on a shaft *d*, one end of which turns

in a liner *e*, carried by the drum *a* as a bearing. The other end of said shaft carries either the driving-wheel or the pinion for operating the same. Arms on the boss *c* are connected by bolts *f f'*, working in radial slots to two semicircular segments or shoes *g g'*, faced with leather *h*, for making contact with the interior circumference of the drum *a*, the two segments *g g'* being movable radially by means of pairs of right-and-left screws *i i'*, screwing into nuts pivoted by gudgeons *j* in ears *k*, fixed to the segments *g g'*, the pivotal axes of the nuts being perpendicular to their bores, so that the nuts are enabled to adapt themselves to the movement of the segments *g g'*. The screws *i i'* are turned by lever-arms *l l'*, connected by toggle-links *m m'* to a grooved collar *n*, capable of sliding upon shaft *d*, but keyed thereto by a groove and feather, so as to rotate therewith. By the sliding movement of sleeve *n* the screws will be turned and force the shoes *g g'* more or less tightly against the rim of the drum *a*, according to the amplitude of the movement. The two collars *n* are operated through lever-and-link connections from the steering-gear, upon the movements of which the friction-gears thus depend.

In the example illustrated a crank-pin *o*, placed in rear of the king-bolt *p*, is coupled by rods *q q'* to bell-crank levers *r r'*, coupled by pin-and-slot connections to rods *s s'*, coupled to the arms of forked levers *t t'*, which engage the grooves of the collars. Springs *u*, connected to the forks *t t'*, tend to hold the coupling in engagement under the tension, but are counteracted by the rods *q q'* when in tension, but not when in compression. Thus the tension on the rod *q* when the crank-pin *o* is moved by the steering-gear to the position shown in dotted lines overcomes spring *u* and causes the clutch to which rod *q* is connected to be slackened proportionately to the shorter travel of the wheel running in the smaller curve, while the thrust on the rod *q'* merely causes the bell-crank lever *r'* to play in the slot of connecting-rod *s'*, thus allowing the spring freedom to cause the corresponding coupling to be tightened to its utmost extent. The lengths of the rods *q q'* are so adjusted by screw-couplings *v* that in normal running in a straight line the studs of the bell-crank levers *r r'* will be at the ends of the slots of the rods *s s'*.

We claim—

1. In a power-driven vehicle the combination with the steering-gear, of friction clutch-couplings respectively corresponding to the two driving-wheels and consisting each of a drum on the common driving-shaft, in combination with friction-segments revolving with the driving-wheel or intermediate shaft, and adapted to be moved radially into or out of frictional contact with the drum by means of screws operated by toggle mechanism actuated by a sliding collar and of a spring tending to throw the clutch into gear, and link-and-lever mechanism acting on the collar and spring and connected to a crank on the swiveling fore-carriage so as to overcome the spring and slacken the clutch, when the fore-carriage is swiveled in such direction as to guide the carriage toward the side at which the said clutch and corresponding wheel are situated substantially as specified.

2. In a power-driven vehicle the combination of steering-gear and a plurality of wheels, each of the said wheels being arranged to be driven from a friction-clutch and operating mechanism for the clutches connected to the driving-gear and arranged to increase the frictional contact of one clutch and decrease the frictional contact of the other clutch simultaneously proportionally to the swing or turn of the steering-gear, whereby when the steering-gear is operated the clutches may be so operated as to transmit movement to the wheels proportionally to the radii of the curves described by the said wheels in turning.

3. In a power-driven vehicle the combination with the steering-gear and a plurality of driving-wheels, a driving mechanism and a plurality of friction-clutches, a clutch being placed in operative relation to each one of the said wheels, and operating mechanism for the said clutches constructed to automatically increase the frictional contact of one clutch and decrease the frictional contact of the other clutch simultaneously proportionately to the angular movement or swing of the steering-gear.

The foregoing specification of our friction-gear for actuating the driving-wheels of power-driven vehicles signed by us this 28th day of July, 1899.

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EUGÈNE JULES LAMIELLE.
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