

(No Model.)

V. BÉLANGER.
CAR IMPELLING MECHANISM.

No. 536,325.

Patented Mar. 26, 1895.

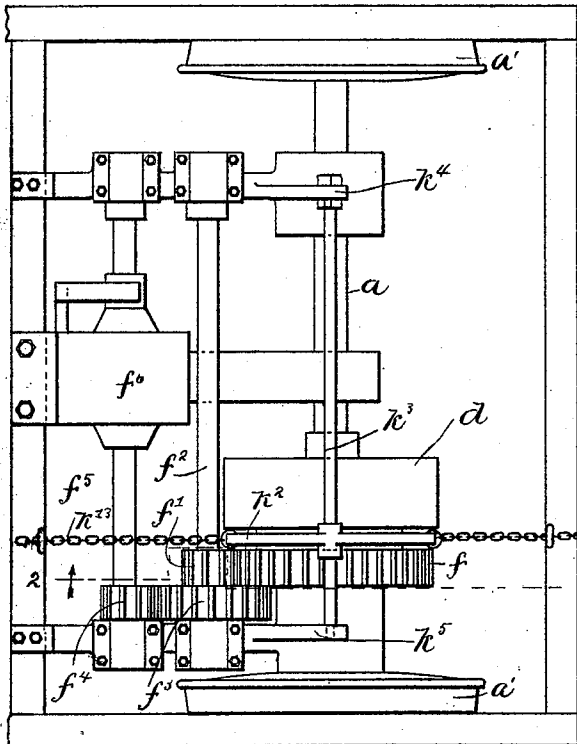


FIG. 1.

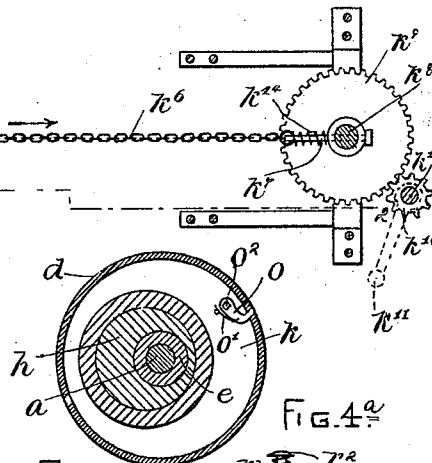
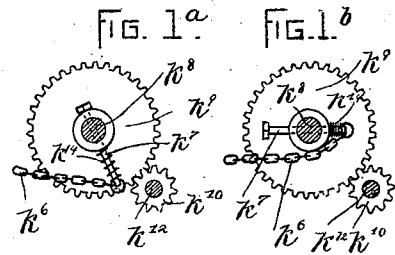


FIG. 2.

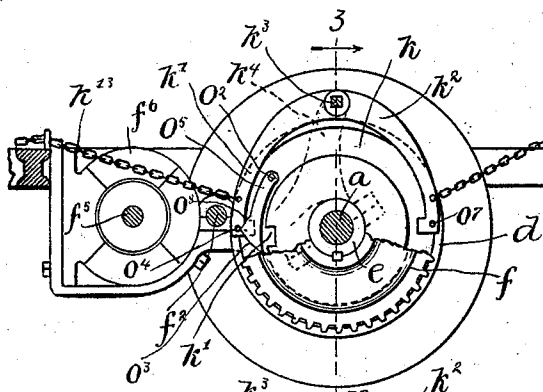


FIG. 3.

WITNESSES:

A. D. Harrison

Rollin Abell.

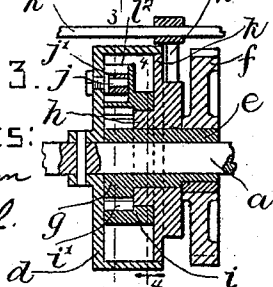
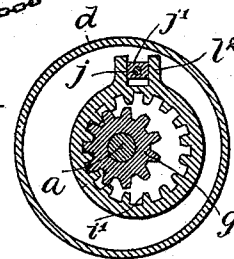


FIG. 5.



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UNITED STATES PATENT OFFICE.

VICTOR BÉLANGER, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF
TO MARY E. BRADY, OF SAME PLACE.

CAR-IMPELLING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 536,325, dated March 26, 1895.

Application filed January 25, 1895. Serial No. 536,188. (No model.)

To all whom it may concern:

Be it known that I, VICTOR BÉLANGER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Car-Impelling Mechanism, of which the following is a specification.

This invention relates to mechanism for connecting an electric or other motor with a shaft or axle driven thereby, in such manner that the power may be increased (although at the expense of speed) when extra power is required, as in starting the car or when a car provided with the mechanism of my invention has to ascend a steep grade.

The invention has for its object to provide an improved mechanism for the purpose above named, which shall be simple and effective and readily controlled by a motor-man or attendant on the car; and to this end it consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification,—Figure 1 represents a bottom plan view of a portion of a car-truck provided with my improved mechanism. Figs. 1^a and 1^b represent detail views hereinafter referred to. Fig. 2 represents a section on line 2—2 of Fig. 1. Fig. 3 represents a section on line 3—3 of Fig. 2. Fig. 4 represents a section on line 4—4 of Fig. 3, looking toward the left. Fig. 4^a represents a section on the same line, looking toward the right. Fig. 5 represents a section on line 5—5 of Fig. 3. The same letters of reference indicate the same parts in all the figures.

In the drawings—the letter *a* designates the motor-driven axle of a car, and *a'* *a'* the wheels thereon. To the axle is rigidly secured a flange *d*, preferably formed as a casing containing the changeable gearing hereinafter described. A sleeve *e* is mounted loosely on the axle *a* and extends into the casing *d*. To the outer end of said sleeve outside the casing, there is affixed a gear-wheel *f* for engagement with the smaller gear *f'* on the intermediate shaft *f*², which is connected by gears *f*³ *f*⁴ with the motor-driven shaft *f*⁵, the latter being connected with an electric or other motor *f*⁶. On the inner end

of the sleeve *e* within the casing there is formed a pinion *g*. Loosely mounted on the sleeve *e* within the casing there is an eccentric *h* supporting a strap or ring *i* which is extended from one side of the eccentric, its extended portion being formed as an internal gear *i'*, which is in mesh with the pinion *g*. Said internal gear has a radial slotted arm *l*² the slot of which receives a pin *j* fastened to the flange or casing *d* and carrying a block *j'* adapted to slide in the slot. The said slotted arm *l*² and pin *j* constitute a self-adjusting connection between the internal gear and the axle, whereby said parts are caused to rotate together, said connection permitting such independent lateral movements of the internal gear as are caused by the eccentric when the latter is locked, as hereinafter described.

On the hub of the eccentric there is formed a flange *k* having a recess *k'* for engagement with a detent *k*² which is mounted to swing toward and from the flange *k* and is controlled through suitable intermediate connections by an operating device on a platform of the car, said device being here shown as a vertical shaft *k*¹² having a crank *k*¹¹ arranged to be grasped by the motor-man and connected with the detent through the pinion *k*¹⁰, gear *k*⁹, shaft *k*⁸, arm *k*⁷, and chain *k*⁶.

The operation is as follows: In the normal condition of parts, the eccentric is left free to rotate, and power applied to rotate the pinion *g* is transmitted directly to the axle, the pinion and internal gear remaining locked together at one place so that the eccentric turns with the pinion and the axle is driven the same as though the gear *f* was affixed to the axle as usual.

To obtain increased power in starting the car, or whenever it is needed, the motor-man by turning the shaft *k*¹² in the proper direction throws the detent *k*² against the perimeter of the flange *k*, so that the recess *k'* thereof will encounter the detent. When this takes place, the eccentric is held stationary, and then the pinion turns the internal gear on the eccentric and the motion is transmitted through said gear to the axle, the described self-adjusting connection allowing for the resulting radial variation of movement between

the internal gear and the axle. The operating shaft k^{12} is preferably the shaft that operates the brakes of the car, the arrangement being such that when the shaft is turned to
 5 apply the brakes and stop the car, the gearing is changed from high to low. The detent is normally held out of engagement with the eccentric flange k by means of a resilient bar k^3 to which the detent is affixed, said bar be-
 10 ing rigidly attached to a bracket k^4 and fitted to turn loosely in a bracket k^5 . When the chain k^6 is pulled in the direction indicated by the arrow in Fig. 1, the detent k^2 is moved inwardly against the flange k , the bar k^3 be-
 15 ing twisted and put under torsional strain by this movement, so that when the chain is allowed to slacken the bar disengages the detent from the flange. I prefer to connect with the detent another chain k^{13} which extends to
 20 the opposite end of the car and is there connected with an operating device similar to that above described in connection with the chain k^6 , the detent comprising two duplicate parts rigidly connected and arranged at op-
 25 posite sides of the axle, as shown in Fig. 2, so that the change from high to low gearing and vice versa can be effected from either end of the car. The bar k^3 is adapted to act in either direction, so that it returns the detent to its
 30 normal position after it has been moved by the chain k^{13} .

The shaft k^{12} is preferably the same shaft that is used to apply the brakes, the brake-chain being connected with said shaft as
 35 usual, so that its rotation in one direction applies the brake-shoes to the wheels, while its opposite rotation releases the brake-shoes. The described connection between the brake-shaft k^{12} and the detent is intended to engage
 40 the detent with the eccentric while the brake-shoes are being applied to stop the car, and to keep the detent in engagement with the eccentric for a brief period after the brake-shoes have been separated from the wheels,
 45 so that the connection of the motor to the driven axle is changed from high to low gear by the operation of applying the brakes, and remains at low gear after the release of the wheels by the brakes long enough to enable
 50 the car to be started through the low-gear connection, the high-gear connection being then automatically resumed. These results are attained by the employment of the pinion k^{10} , gear k^9 , and arm k^7 , as illustrated in Figs. 1^a and 1^b. The said pinion and gear are propor-
 55 tioned so that the rotation of the brake-shaft k^{12} required to apply the brakes will give the gear k^9 and shaft k^3 only a partial rotation, carrying the arm k^7 from the position shown in Fig. 1 to that shown in Fig. 1^b, or there-
 60 about. The arm is adapted to move endwise in an orifice in the shaft k^3 , so that after the arm has passed the position shown in Fig. 1^a (the slack of the chain k^6 being then taken up
 65 and the detent engaged with the eccentric flange) it will slip in the shaft during the re-

mainder of the movement sufficiently to prevent excessive or injurious strain on the chain and detent, and without permitting the slackening of the chain. It will be seen, therefore, 70 that during the latter part of the brake-applying movement and the first part of the brake-releasing movement of the shaft k^{12} , the detent remains in engagement with the eccentric flange, the chain k^6 being held taut until 75 the backward rotation of the brake-shaft brings the shaft k^3 and arm k^7 to such position as will enable the chain to slacken and the torsional bar k^3 to restore the detent to its normal position. A spring k^{14} may be employed 80 to force the arm k^7 back to the position shown in Fig. 1 during the backward rotation of the brake-shaft, said spring maintaining a tension on the chain until the arm in its return movement passes the point where it is shown 85 in Fig. 1^a. An essential part of the connection between the brake-shaft and the detent is therefore a provision for a lost motion, such as that afforded by the sliding arm k^7 whereby the detent is held stationary during the lat- 90 ter part of the brake-applying movement and the first part of the brake-releasing movement of the brake-shaft. I do not limit myself to the means here shown for producing this result, and may employ any other suitable 95 means having provision for the described lost motion.

I prefer to provide means for positively locking the eccentric to the flange or casing d when the parts are operating normally and for re- 100 leasing the eccentric from the casing when the low-gear connection is established; and to this end, I provide the flange k with a dog o (Fig. 4^a) which is pressed outwardly by a spring o' and is adapted to engage a slot in the casing 105 d . Said dog is affixed to a stud o^2 which passes through the eccentric flange k and has on its outer end an arm o^5 provided with an inclined outer end o^3 which occupies such relation to a stud o^4 on the detent k' that when 110 the detent is in its normal position the stud o^4 permits the dog o to move outwardly into engagement with the casing d , as shown in Fig. 4^a. When the detent is moved inwardly to engage the flange k , the stud o^4 acts on the 115 inclined end o^3 and swings the arm o^5 inwardly, thus disengaging the dog o from the casing. The other arm of the detent is provided with a stud o^7 which co-operates with an incline o^8 on the arm o^5 in disengaging the 120 dog from the casing when the detent is operated from the other end of the car through the chain k^{13} .

In case it is desirable to change from high to low gear without applying the brakes, as 125 in ascending a steep grade, or when moving slowly through a crowded thoroughfare, means may be provided for operating the detent independently of the brakes. Such means may be, for example, a bell-crank lever r lo- 130 cated below the platform, one arm of the lever being connected by a branch chain or rod r'

with the chain k^6 and the other arm with a pedal r^2 arranged to be depressed by the motor-man. When the pedal is depressed, the lever r is moved in the direction required to pull on the chain and engage the detent with the eccentric. When the pedal is released, it is raised by a spring r^3 . The pedal may be locked in a depressed position by a dog or locking device r^4 to maintain the low-gear connection.

I claim—

1. A car-impelling mechanism comprising a motor, a driving pinion loose on the driven axle of the car and operatively connected with the motor, a loose eccentric surrounding the said axle and provided with a detent-engaging member or flange, an internal gear journaled on said eccentric and meshing with the driving pinion, a self-adjusting connection between said internal gear and the axle whereby said gear is caused to rotate with the axle and permitted to move laterally independently thereof, and a detent whereby the eccentric may be held stationary.

2. A car-impelling mechanism comprising a motor, a sleeve loosely mounted on the driven axle of the car and provided with a gear operatively connected with the motor and with a driving pinion, an eccentric loosely mounted on said sleeve, an internal gear loosely mounted on said eccentric and having a detent-engaging flange, a self-adjusting connection between said internal gear and the axle whereby said gear is caused to rotate with the axle and permitted to move laterally independently thereof, and a detent whereby the eccentric may be held stationary.

3. A car-impelling mechanism comprising a motor, a driving pinion loose on the driven axle of the car and operatively connected with the motor, a loose eccentric surrounding the axle, a self-adjusting connection between the internal gear and axle, a detent whereby the eccentric may be held stationary, an operating device on the car, and connections between said operating device and detent.

4. A car-impelling mechanism comprising a motor, a driving pinion loose on the driven axle of the car and operatively connected with the motor, a loose eccentric surrounding the axle, a self-adjusting connection between the internal gear and axle, a detent whereby the eccentric may be held stationary, a torsional bar which normally holds the detent out of engagement with the eccentric, said bar being rigidly held at one end and free to turn at the other, and means for moving said detent into engagement with the eccentric, the bar being put under torsional strain by said movement and thereby adapted to return the detent to its normal position.

5. A car-impelling mechanism comprising a motor, a driving pinion loose on the driven axle of the car and operatively connected with the motor, a loose eccentric surrounding the

said axle and provided with a detent-engaging member or flange, an internal gear journaled on said eccentric and meshing with the driving pinion, a self-adjusting connection between said internal gear and the axle whereby said gear is caused to rotate with the axle and permitted to move laterally independently thereof, a detent whereby the eccentric may be held stationary, a crank-shaft controlled by an attendant on the car, and a chain connected with the crank-shaft and with the detent.

6. A car-impelling mechanism comprising a motor, a driving pinion loose on the driven axle of the car and operatively connected with the motor, a loose eccentric surrounding the said axle and provided with a detent-engaging member or flange, an internal gear journaled on said eccentric and meshing with the driving pinion, a self-adjusting connection between said internal gear and the axle whereby said gear is caused to rotate with the axle and permitted to move laterally independently thereof, a double or two-armed detent the arms of which are arranged at opposite sides of said flange, two chains or flexible connecting devices extending from said arms to operating devices at opposite ends of the car, and means for yieldingly holding said arms out of engagement with the said flange.

7. In a car-impelling mechanism, the combination of a motor, a driven axle, changeable gearing connecting the motor with the axle, and gear-changing mechanism controlled by an operator on the car, said mechanism comprising a movable operating device such as a detent arranged to act on the gearing, a brake-shaft arranged to be rotated by the operator, and connections between said shaft and detent whereby the detent is made operative, said connections having provision for a lost motion whereby the detent is made operative before the completion of the brake-applying movement and is held in operative position during the first part of the brake-releasing movement of said shaft.

8. In a car-impelling mechanism, the combination of a motor, a driven axle, changeable gearing connecting the motor with the axle, and gear-changing mechanism controlled by an operator on the car, said mechanism comprising a movable operating device such as a detent arranged to act on the gearing, a brake-shaft arranged to be rotated by the operator, a pinion on the brake-shaft, a gear-meshing with said pinion, a shaft affixed to said gear, an arm fitted to slide across said shaft, and a chain connecting the said arm with the detent.

9. The combination of the axle, the casing affixed thereto, the loose driving pinion, the loose eccentric having a detent-engaging flange, the internal gear journaled on the eccentric and meshing with the pinion, a locking device adapted to automatically connect

the eccentric with the casing, a detent whereby the eccentric may be held stationary, and connections between the detent and locking device whereby the eccentric is disengaged
5 from the casing when the detent is operated to hold the eccentric.

In testimony whereof I have signed my

name to this specification, in the presence of two subscribing witnesses, this 22d day of January, A. D. 1895.

VICTOR BÉLANGER.

Witnesses:

C. F. BROWN,

A. D. HARRISON.