J. C. MOORE.

Car-Starter.

No. 159,766. Patented Feb. 16, 1875.

Fig. 1.

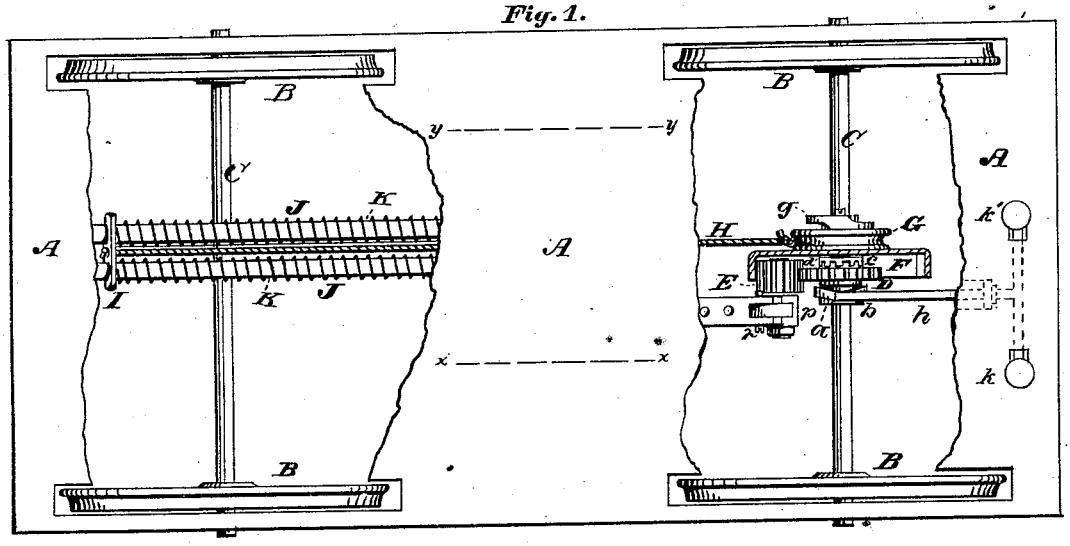


Fig. 2.

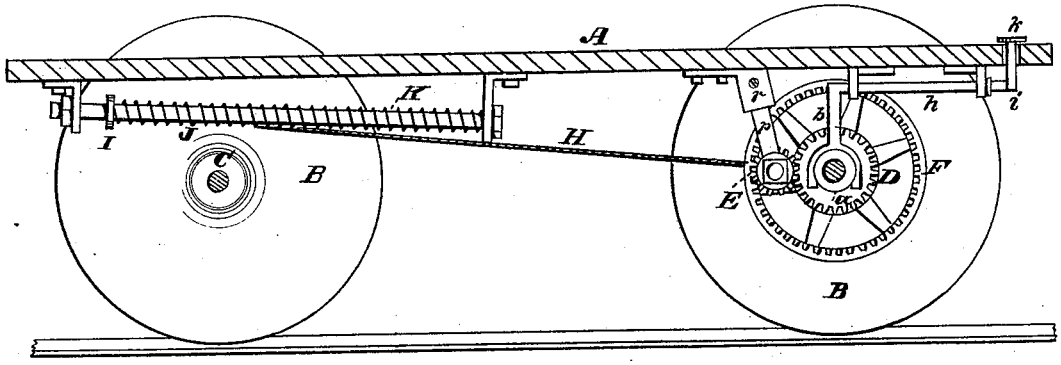
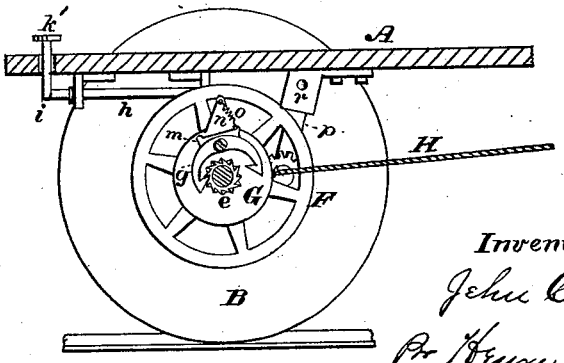


Fig. 3.



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UNITED STATES PATENT OFFICE.

JEHU C. MOORE, OF MADISON, INDIANA, ASSIGNOR OF ONE-HALF HIS RIGHT TO HENRY B. GIBSON, OF CINCINNATI, OHIO.

IMPROVEMENT IN CAR-STARTERS.

Specification forming part of Letters Patent No. **159,766**, dated February 16, 1875; application filed September 21, 1874.

To all whom it may concern:

Be it known I, JEHU C. MOORE, of Madison, in the county of Jefferson and State of Indiana, have invented certain Improvements in Car-Starters, of which the following is a specification:

The object of this invention is to utilize the brake-power used to check the momentum of the car in stopping, to overcome the inertia of the mass, and start, or assist in starting, the car.

I prefer to use spring-power for the purpose, and by a peculiar arrangement of different-sized gear-wheels in connection with the spring the car travels twice the distance in winding up the spring, or giving it the maximum tension, that the said spring will drive the car in starting.

I thus obtain twice the power in starting that is exerted in resisting the momentum when the car is stopped, but it is only exerted over half the distance.

To overcome the inertia in starting it is only necessary to move the car, and by my arrangement all the power stored up may be applied to accomplish this, disregarding the distance moved.

Although I show and prefer the ratio of one to two between the gear-wheels, this ratio may be departed from without detriment to the principle.

In the drawings, Figure 1 is a plan of my invention. Fig. 2 is a longitudinal vertical section of the same in the plane of the line *x x* in Fig. 1. Fig. 3 is a vertical section of a part of my invention in the plane of the line *y y* in Fig. 1.

Like letters of reference designate corresponding parts in all of the figures.

My invention is particularly applicable to street-cars.

Let A represent the bottom of the car-body, B B the track-wheels, and C C the axles. As my device is applicable to either single or double end cars, the gearing may be placed on either axle. D is a spur-wheel, which turns loosely on the axle C. E is a pinion, meshing therewith, and turning loosely on a journal suspended from the bottom of the car. This pinion also meshes with an internal gear-wheel, F, and forms an intermediate between this wheel and the wheel D. The wheel F also turns loosely on the axle C, and is concentric to the wheel D. At the back, and forming a part of the wheel F, is a grooved windlass barrel or drum, G, of the same size of the wheel D, to which is secured one end of a rope or chain, H, the other end being attached to a cross-head, I, which operates against the ends of two helical springs, J J, on guide-rods K K. These rods may be supported in bearings secured to the bottom of the car, substantially as shown.

Any kind of spring may be used, so that it fulfills the conditions of strength and compressibility.

On the outer face of the wheel D, and forming a part of the same, is a grooved boss, *a*, to receive a shifting-fork, *b*, which will be described farther on. On the inner face of the said wheel D, and also forming a part of the same, is a square-toothed clutch, *c*, so constructed as to mesh with a corresponding clutch, *d*, secured rigidly to the axle C. Also secured to the axle C, beyond and adjoining the drum G, is a double rag-wheel or ratchet, *e*, and engaging with the said ratchet is a double pawl or detent, *g*.

The object of making the detent and ratchet double will be explained farther on. For present purposes they will be considered as constructed in the ordinary manner.

The shifting-fork *a*, before mentioned, is attached to the end of a horizontal rock-shaft, *h*, arranged to oscillate in bearings secured to the bottom of the car. To the other end of this shaft is secured a horizontal cross-bar, *i*, and to each end of this bar is attached a tread, *k*, which extends up through the platform of the car within reach of the driver's foot.

The operation is substantially as follows: As the car approaches within about its length of the point where the driver wishes to stop it, he applies his foot to the proper tread *k*. This engages the clutch *c*, on the inner face of the wheel D, with the clutch *d*, which is rigidly secured to the axle. The engagement of the clutches is accomplished by slipping the wheel D along the axle through the medium of the fork *b*, rock-shaft *h*, cross-bar *i*, and

tread *k*. The clutch *d* imparts a rotary motion to the wheel D in the same direction as the axle, and with the same velocity. This wheel in turn communicates a rotary motion through the pinion E to the internal gear F, but in an opposite direction, and at only half the velocity of the wheel D. This causes the rope H to wind upon the drum G, compressing the springs J J.

If all the parts are properly proportioned, and the driver throws the clutches into gear at the proper time, the spring will be at its maximum tension when the car stops.

I prefer, however, to give the spring the maximum tension only when the car is heavily loaded, using a less tension for a light load. This, it will be seen, is regulated by the distance the car travels after the clutches are engaged.

When the driver wishes to start the car he disengages the clutches *c d* by pressing upon the other tread, *k'*. The rope H having been wound upon the drum in the opposite direction from which the car is traveling, it follows that when the clutches *c d* are disengaged the power of the compressed springs will be exerted in rotating the drum G in the opposite or forward direction. But when the drum rotates in this direction the detent *g* engages with the ratchet *e*, and the whole power of the spring is thus exerted in the rotation of the axle forward.

As the action of the spring is direct in starting the car it is plain that the whole power stored up acts to rotate the axle forward with a leverage equal to the radius of the drum G.

By saying that the ratchet *e* is double, I mean that there are two sets of teeth, the beveled faces of each set being inclined in opposite directions. The opposite ends of the double detent *g* are in different vertical planes, so as to engage with the two ratchets on opposite sides, each end of the detent engaging with its particular ratchet.

It will be seen by reference to Fig. 3 that the detent is pivoted at the center, and is so constructed that when one end is engaged the other stands free.

On the back of the detent is a bail, *m*, and to the rim of the drum G is secured an upright, *n*. To the top of this upright is attached a spring, *o*, which extends down and takes hold of the bail *m*. This spring is capable of being slipped back and forth on the bail, and when at one end it draws that end of the detent up, and keeps the other end engaged with its ratchet. By slipping it to the other end the opposite end of the detent becomes engaged with its ratchet.

This device is only required on "double-end," cars or those intended to travel in opposite directions without turning around.

When the motion of the car is to be reversed the spring *o* is slipped to the opposite end of the bail *m*, and the device is ready for operation.

When a turn-table is used, and the car is turned at the end of the track, a simple ratchet and detent, with a suitable spring to keep it engaged, is all that will be necessary.

It must be understood that the detent never engages with the ratchet until the car stops. While the car is running the detent rises over the teeth of the ratchet, and to avoid rattling the detent may be faced with leather on the under side, so arranged as to strike on the points of the teeth and deaden the sound.

I have shown the drum G as circular in form, but it may be made in a spiral or volute form, so as to compress the spring slowly at first, and increase as the car nears the stopping-point.

I have stated that the pinion E is suspended from the bottom of the car. If the suspension-bar *p* was attached directly to the car-bottom, and was rigid, the motion of the car-bed up and down on its springs would seriously damage the gearing. To avoid this I hinge the said bar between two jaws, *r r*, which latter are secured to the bottom of the car. This allows the pinion the proper play to avoid injury.

As the wheel D is slipped back and forth on the axle to engage and disengage the clutches *c d*, I prefer to make the pinion E correspondingly broader on the face, so that it may always remain fully engaged with said wheel D.

A collar may also be placed on the axle outside of the wheel D to govern its travel along the axle in shifting.

In view of the present state of the art I wish it understood that, although I have deemed it necessary to describe the entire device for starting the car, so that the novel parts may be the more clearly understood, I do not claim the internal gear F, drum G, or wheel D, specifically, but only in the combination expressed in my first claim; nor do I consider revolving the drum, by means of intermediate gearing, in the contrary direction from the axle to wind up the rope or chain, as novel, for this has been done before; and I especially disclaim the use of a spring for this purpose, as that is known to be old; but,

Having thus described my invention, what I claim is—

1. The pinion E, suspended by the bar *p*, hinged between the jaws *r r*, in combination with the wheels F and D, to operate substantially as and for the purposes set forth.

2. The device consisting of the double ratchet *e*, double detent *g*, bail *m*, standard *n*, and spring *o*, combined substantially as set forth.

JEHU C. MOORE.

Witnesses:
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SAMUEL HARVEY.