W. HILDEBRAND.

CAR-STARTER.

No. 176,749. Patented May 2, 1876.

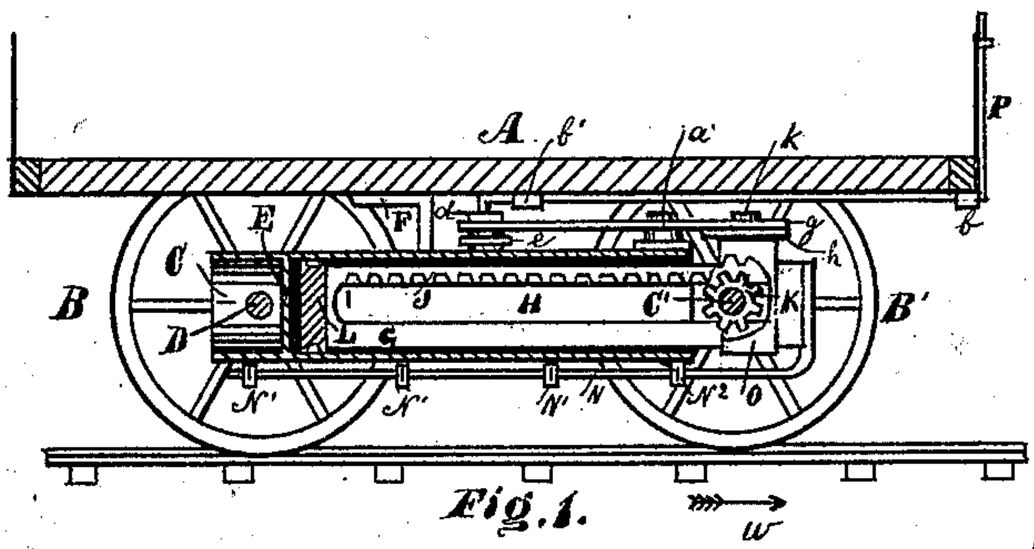

Fig. 1.

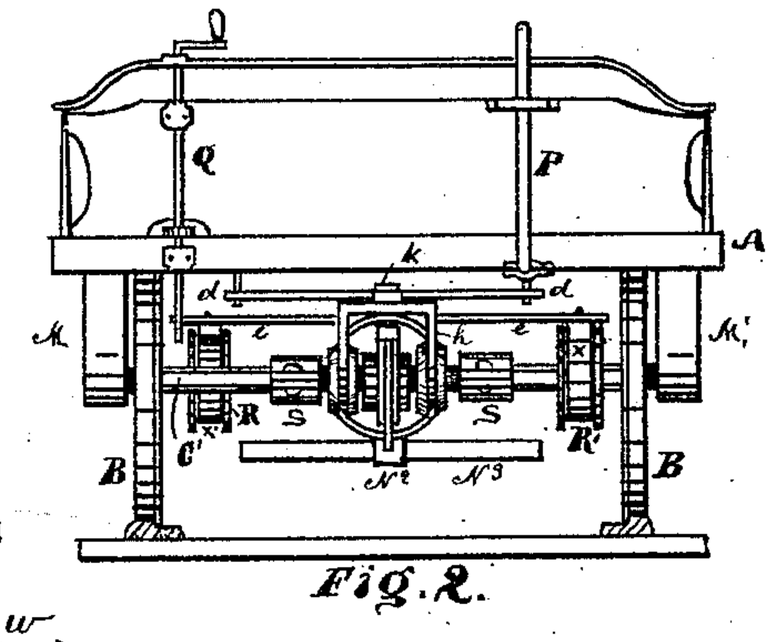

Fig. 2.

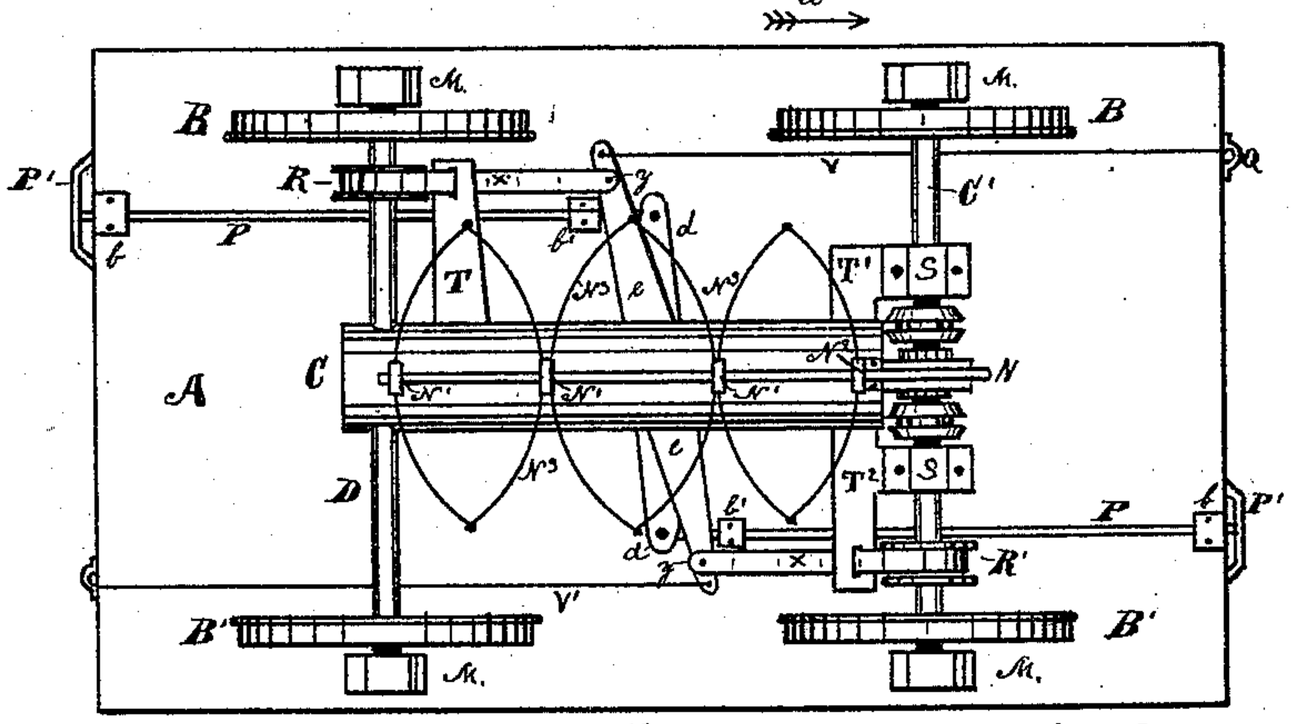

Fig. 3.

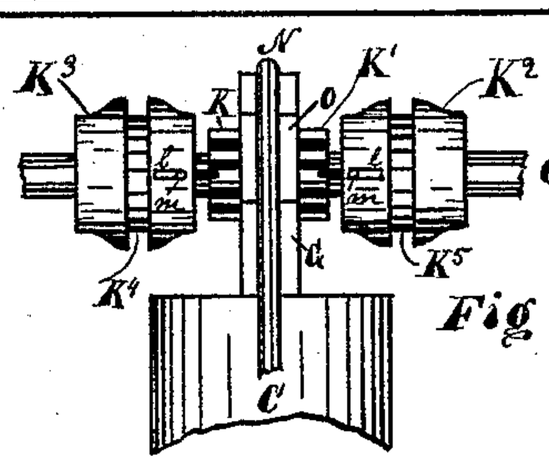

Fig. 4.

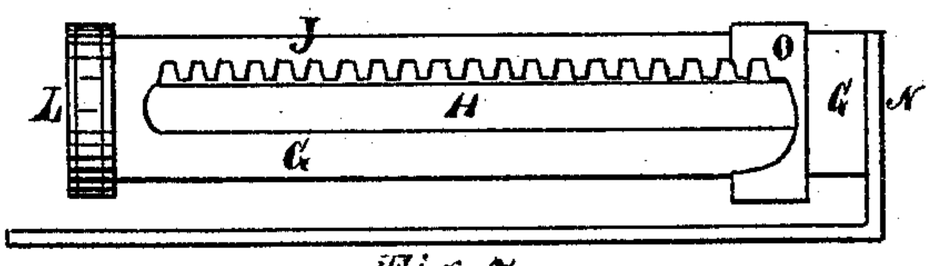

Fig. 5.

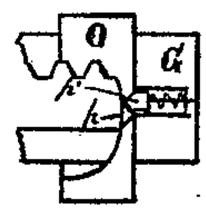

Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM HILDEBRAND, OF FORT WAYNE, INDIANA.

IMPROVEMENT IN CAR-STARTERS.

Specification forming part of Letters Patent No. **176,749**, dated May 2, 1876; application filed September 11, 1875.

To all whom it may concern:

Be it known that I, WILLIAM HILDEBRAND, of Fort Wayne, Allen county, State of Indiana, have invented a new and useful Apparatus for Stopping and Starting Cars, of which the following is a specification, reference being had to the accompanying drawings.

My invention consists of the construction and arrangement of several mechanical devices, whereby the momentum of the car, when the motion is arrested, is made to accumulate a power sufficient to start the car, thus relieving the starting strain on the horses.

Figure 1 represents a sectional side elevation of a car embodying my improvement. Fig. 2 is a front elevation of the same. Fig. 3 is a plan view of the bottom of a car, showing more fully the arrangement of parts. Fig. 4 is an enlarged view of the working devices that are attached to one of the axles of the car. Fig. 5 is a side elevation of the rack, piston-rod, and head. Fig. 6 is a sectional view of the slide O and its connections with the rack-rod.

A represents the bottom of the car, to which is secured the cylinder C. The axle D passes through one end of the cylinder, as shown in Figs. 1 and 2. The cylinder C is designed as a vacuum-cylinder, and is provided with a head, E. (Shown in Fig. 1.) In this cylinder works the piston-head L, which is attached to the rack-rod G. (Shown more fully in Fig. 5.) This rack-rod G is provided with a rack, J, on one side at the top of the opening H, and also with a rack on the opposite side at the bottom of the opening H, the operation of which will be described hereafter. The opening H or space between the racks is to allow the piston rack-rod to work on each side of the shaft or axle C′ as the piston is drawn out or drawn back into the cylinder C. At one end of the rack piston-rod G is arranged a slide, O, which works transversely on the rod G. The upper inside edge and the lower inside edge diagonally opposite to each other are provided with one or more cogs, so as to continue the cogs on the racks on each side alternately as follows: When the slide is in the position shown in Fig. 5 the rack J is extended one or two cogs, while the opposite rack (not shown in the drawings) is short one or two cogs. By elevating the slide O, then the top rack J will be short one or two cogs, and the lower rack will be extended. The slide O is shown partially in section in Fig. 6, where it will be seen that there is a V-shaped partition or bar, *p*, in the center, and a V-shaped or pointed spring-catch, *p′*, inserted in a hole in the end of the rack-rod G, all operated so as to hold the slide O up or down, according to which way the car is going, which will be described hereafter. On the shaft C′, near its center, are arranged two clutch-couplings, K^2 and K^3, which are keyed to the shaft by feather-keys, so as to allow a sliding motion. Near the center of each of these clutch-couplings are grooves K^4 K^5. (Shown more fully in Fig. 4.) In these grooves the arms of the sliding clutch *h* are inserted, as shown in Fig. 2. This sliding clutch *h* is pivoted to the lever *g* at *k*, (shown in Fig. 1,) and the lever *g* extends backward, and is also pivoted at *a* to the cylinder C, and to the rear end of the lever *g* is also pivoted the cross-lever *d*, which has a sliding motion on the lever *g* at the pivot-joint, and is provided with holes near each end, to receive one end of the crank-rods P P. These rods extend along under the car, and are supported by suitable boxes *b b′*. At each end of the car these rods turn up at a right angle, and extend a short distance above the fender, and are held in this upright position by means of the loop or band P′, which is arranged so as to allow of a side motion to the extended arm P. By moving the arm P′ to one side it communicates a side motion to the sliding lever *d* by means of the short crank at the other end of the rod P, and forces it to one side, and the lever *d* being pivoted to the lever *g* causes it to partially rotate on its pivot *a*, and imparts a side motion to the sliding clutch *h*. This clutch being connected with the clutch-couplings, forces one of them in gear with the pinions K or K^1, which are both loose on the shaft C′, and as the wheels B B′ are revolved by the motion of the car, the pinion K or K^1, which is in gear with the clutch-coupling, is revolved, and, being engaged with one of the racks J on the rack piston-rod G, draws the rack and piston G L forward, causing a vacuum in the cylinder C until sufficient strain has been put onto the car-axle by means of the pinion K or K^1 to stop the car.

The pinion not in gear with the clutch K^2 or K^3 revolves loose on the shaft; but when the car has been stopped, as above described, then the crank-arm P is reversed, in order to propel the car forward. This movement of the arm P reverses the clutch-couplings, and the vacuum in the cylinder C draws the piston-head L, with the racks J attached, back into the cylinder, and the motion of the rack is communicated to the opposite pinion from that which drew the piston out, and exerts a pressure or power on the pinion sufficient to start the car. The elliptic springs N^3 are arranged on the rod N, which is attached to the end of the rack-rod G, as shown in Figs. 1 and 5. This rod passes through the guide N^2, which is secured on the cylinder C, and the elliptic springs N^3 are then slipped on the rod N, and the last one secured from working off of the rod by means of a pin or nut on the end of the rod N. These springs can be used separate or together with the cylinder, in order to produce a reaction on the axle.

If the car is going in the direction of the arrow *w*, then the clutch K^3 is brought into contact with the pinion K, and the pinion K^1 and clutch K^2 are disengaged until the car stops, when the crank-rod P is reversed, the clutch K^3 is disengaged from the pinion K, and the cluch K^2 is connected with the pinion K^1. This causes the car to move forward; otherwise it will run backward. When the car is run in the opposite direction, then the reverse of this operation is applied with the same results. The slide O on the end of the rack-rod G is always thrown out of gear on one side or the other whenever the car starts and the rack has been drawn far enough into the cylinder to allow the pinion K or K^1 to strike the cogs, which then raises or lowers the slide according to which way the car is going. This arrangement always leaves one pinion loose on the axle C^1, and the other in gear with the clutch, the one in gear turning with the clutch and axle, but is not in gear with the rack I. The opposite pinion does not revolve with the axle, because it is not keyed to the shaft, and is in gear with the opposite rack; but when the clutch-couplings are reversed, then the action of the pinions K K^1 is reversed.

The axle on which the working devices of my improved starter (such as the pinions K K^1, clutch-couplings K^2 K^3) operate is also furnished with boxes S S, to support them independent of the main boxing M of the car. This arrangement allows the working parts of the car-starter to always be in line with the axles. On the axles D and C^1 are also arranged the brake-spools R R^1, which are securely keyed thereto. These spools have flanges on each side, so as to prevent the spring-brakes X X from working off. These spring-brakes X and X are lined with leather or other substances to prevent wear on the springs. One end of the brake-springs X is secured to the projecting arms T T^2, and extend over the spools R R^1, and are secured at the other ends to the brake-lever *e*, which is pivoted to the cylinder C under the cross-lever *d*. At the extreme ends of the lever *e* are secured the brake chains or rods V V′, which extend to each end of the car, and are attached to the brake-cranks Q Q, as shown.

When the brake is applied, the straps or spring-brakes X X are brought into contact with the spools R R with sufficient friction to stop the car, or to hold the car from running backward after the starter has accumulated sufficient power.

To put the car in motion, reverse the rod P and let off the brake, when the car will start without the aid of the horses.

The clutch-couplings K^2 K^3 are each provided with a spring-pawl, *l*, that engages with the pinions K K^1, as shown.

What I claim as new, and wish to secure by Letters Patent, is—

1. In combination with the rack-rod G, the slide O, provided with one or more cogs above and below on opposite sides, arranged to operate as described, and held either up or down by means of the V-shaped bar *p* and pointed pawl *p′*, substantially as and for the purpose set forth and described.

2. In combination with the cylinder C, the projecting arms T^1 T^2, arranged with the boxes S S, to support and keep in line the cylinder C, rack-rod G, and its connections with the axle C^1, substantially as and for the purpose set forth and described.

3. The lever G, pivoted to the cylinder C at *a*, and to the sliding clutch *h*, as shown, and operated by the cross sliding lever *d* and crank-rod P, substantially as and for the purpose set forth and described.

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

WILLIAM HILDEBRAND.

Witnesses:
E. O. FRINK,
S. O. FRINK.