2 Sheets—Sheet 1.

E. SALOMON.

CAR-STARTER.

No. 180,792. Patented Aug. 8, 1876.

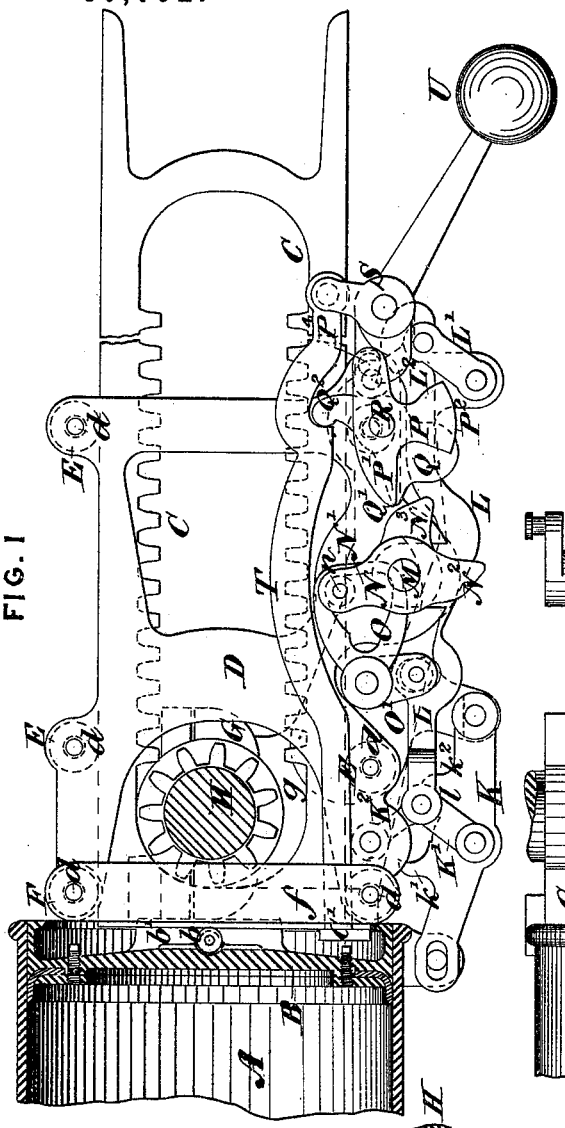

FIG. 1

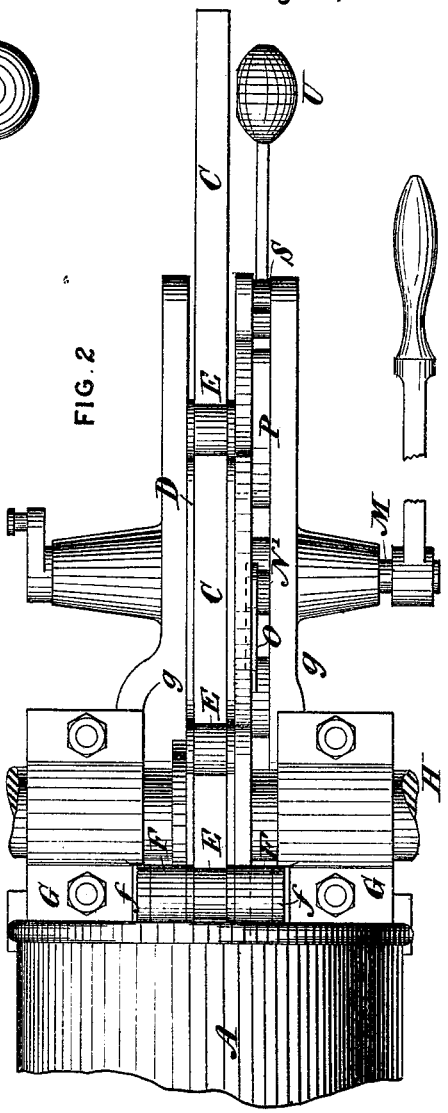

FIG. 2

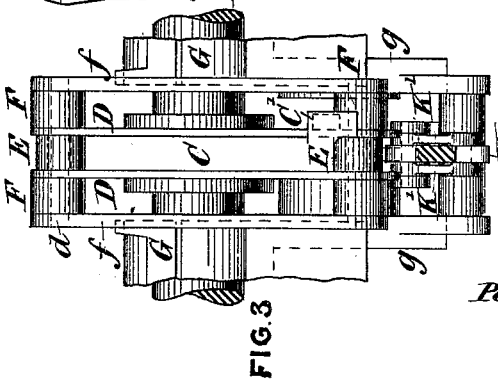

FIG. 3

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2 Sheets—Sheet 2.

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FIG. 4

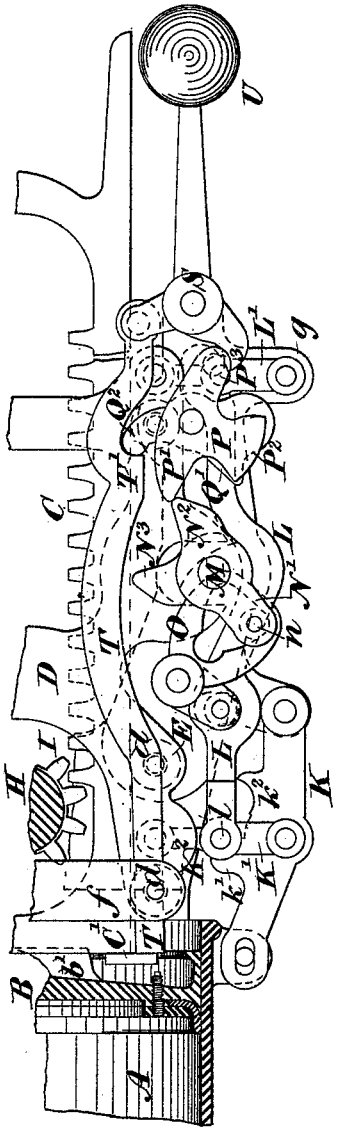


FIG. 5

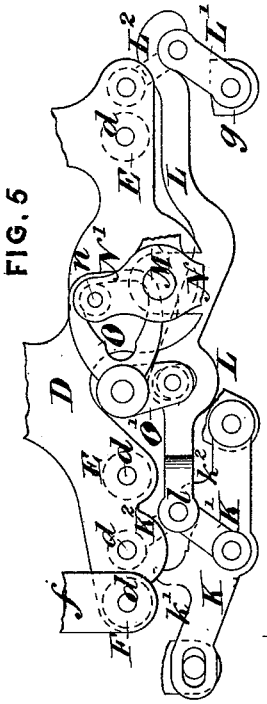
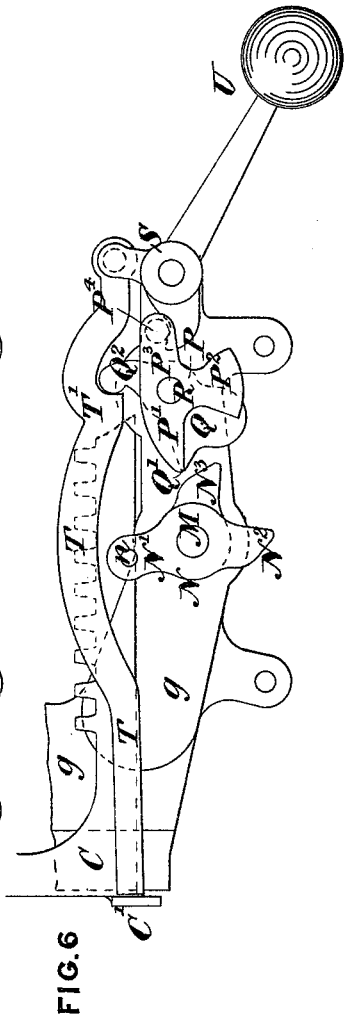


FIG. 6



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UNITED STATES PATENT OFFICE.

ETIENNE SALOMON, OF MONTREAL, QUEBEC, CANADA.

IMPROVEMENT IN CAR-STARTERS.

Specification forming part of Letters Patent No. **180,792**, dated August 8, 1876; application filed April 25, 1876.

To all whom it may concern:

Be it known that I, ETIENNE SALOMON, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Apparatus for the Starting of Street-Cars, &c.; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to that class of car-starters in which the application of the brake, for the purpose of slowing up or stopping the car, throws a spring or air-compressing mechanism in gear with a cog-wheel on the axle of the car, the force thus stored up being utilized on again starting the car.

My improvement consists of certain mechanical combinations, so fully explained hereinafter as to require no preliminary enumeration.

Figure 1 of the drawing is a side view of the apparatus with the piston and rack-bar out to their fullest extent. Fig. 2 is a plan view of the same, looking from underneath. Fig. 3 is an end view of the rack-bar, guides, &c., with the piston and cylinder removed. Fig. 4 is a side view of the invention, showing the rack-bar engaging with the arbor of the wheel. Fig. 5 is a view of the lifting devices separate from the other parts. Fig. 6 is a view of the mechanism for throwing the rack-bar in and out of gear with the axle of the wheels.

A is a cylinder, of any diameter, proportion, and strength, of metal, open either at one or both ends, and secured, in any suitable manner and position, to the car, B being the piston of any approved construction and packing, having arranged on its outer face (hung in proper side pieces) a roller, *b*, against which impinges the double rack-bar C, to be hereinafter more particularly mentioned, and being kept in the proper vertical position by guides b^1 (or any analogous device) projecting from the face of the piston. D D are vertical plates, inclosing between them the rack-bar C, and being of some such form as that shown in Fig. 5. These are secured together at any number of points by pins *d*, which serve as spindles to the friction-rollers E E. F F are similar rollers arranged at the end of the guide-plates D, nearest the cylinder, on either side of the rollers E, and serving as distance-pieces between these rollers and the side pieces *f*, all being securely attached together by the pins *d*, as before described. These pieces *f* slide up and down in grooves formed in the pillow-blocks G, and serve to keep the guide-plates D from moving from the cylinder A, affording them, at the same time, perfect freedom to move in a vertical direction. All these parts are clearly shown in Fig. 3. These pillow-blocks G, and also the frames *g*, are bolted or otherwise secured to flanges cast on the cylinder, in the pillow-blocks being formed bearings for the axle H, having the arbor I firmly secured upon it.

To the lower part of the cylinder is secured, either rigidly or as shown in the drawings, a bent bar, K, having its other end secured to the frame *g*, and provided with projecting stops *k k'* formed upon it. K^1 K^2 are short links pivoted, respectively, to the bent bar K and the plates D, and connected at *l* by a pivot-joint, to the sliding bar L, as shown more particularly in Fig. 5. The other end of this sliding bar L is hooked to the pivoted joint of the short links L^1 L^2, the other ends of these being pivoted, respectively, to the frame *g* and the guide-plates D. M is a short shaft rotated by the action of the brake, either directly or through a lever or other mechanism. Upon this shaft is firmly secured a forked or double cam, N, the configuration of which will be more fully alluded to farther on, its connection with the parts now in course of description being, however, as follows:

O is a slotted cam, of the construction shown in Figs. 1, 4, 5, and 6, in which works a roller or pin, *n*, on the arm N^1 of the cam N, O^1 being a short double link pivoted to the frame *g*, secured rigidly to O, and connecting it with the sliding bar L.

The whole of this lifting apparatus is, for clearness, shown separately in Fig. 5.

The device whereby the double rack-bar C is driven inward, so as to engage with the arbor I on the axle of the wheels, is clearly shown in Fig. 6, and may be thus described: The cam N is, in addition to the arm N^1, furnished with a double fork, N^2 N^3, the former of these engaging with and acting upon the cam P mounted loosely upon a spindle, R, secured to the frame *g*, the cam P having toes P^1, P^2, and P^3, to the latter one of which is secured a pin, P^4, striking into the hooked end of the bent arm S, the other end of this

being pivoted to the bar T, which strikes against a projection, C^1, formed on the side of the double rack C. Upon the spindle R is mounted another cam, Q, with arms Q^1 Q^2, acted upon by the arm N^3 of the cam N, this being shaped so as not to interfere, as it is lifted up, with the toe Q^1. The arm N^3 will, when the cam is brought back to the position shown in Figs. 1, 5, and 6, strike, in its motion, against the upper surface of Q^1, thus bringing the arm Q^2 in contact with the bend T^1 of the bar T. The arm and counterpoise U (raised by the action of each of the devices just described) are, as shown, secured to the center of the bent arm S.

The cam P is properly weighted, so as always to return to the position shown in Fig. 1.

The operation of my invention is as follows: Presuming that the car is in full motion, all the parts will be in the relative positions shown in Figs. 1, 5, and 6, the axle H revolving clear of the racks in the rack-bar C. The action of the brake, when put on to stop the car, will be, either directly or indirectly, such as to rotate the shaft M, and with it the cam N, the roller-pin *n* on the arm N^1 working in the slot of the cam O, (this slot, however, being so shaped that the pin *n* will not act upon the cam until it reaches its extreme throw,) and, by means of the link O^1, pushing inward the sliding bar L, which straightens the toggle-arms K^1 K^2 L^1 L^2, the hook *k* acting as a stop to the pivot-joint *l*, and keeping the toggle arms or links K^1 K^2 at their extreme stretch. As the lower arms K^1 L^1 are pivoted, respectively, to the bent bar K and frames *g*, and are, therefore, incapable of downward movement, this action of the bar L raises the guide-plates D, (to which the arms K^2 L^2 are pivoted,) and brings them to a height sufficient to allow the lower rack of the bar C to engage with the arbor I.

Simultaneously with the above movement the arm N^2 of the cam N is raised by the revolution of the shaft M, and comes in contact with the toe P^1 of the cam P on the shaft R, thus rotating the cam P and causing the pin P^4 to strike into the hooked end S^1 of the bent arm S, throwing the bent bar T sharply backward, and causing it to strike against the projection C^1 on the rack-bar C, pushing it inward sufficiently to enable the teeth on the lower edge of the rack to intermesh with those of the arbor, the parts being in the relative positions shown in Fig. 4. The revolution of the axle will then gradually press inward the rack-bar C, and through it the piston B, thus compressing the air in the cylinder, the force required to do so gradually retarding the revolution of the axle and the motion of the car until both are completely stopped. As soon as the brake is released, and, by the action of so doing, the guide-plates D are lowered, (the movement of the parts for raising them being reversed,) and the upper rack of the bar C is at a point more or less distant from its inner end thrown into gear with the arbor I, the pressure of the air then forces out the piston B and rack-bar C, and the teeth in the upper rack then intermeshing with those of the arbor I, and rapidly turning the axle, thus starting the car. It will, of course, be understood that the rack-bar is brought back to its original position, so as to allow the arbor to revolve clear of its teeth. When the car is running in the opposite direction, the guide-plates D are kept up by the mechanism before described, the rack-bar C being so far forward as not to intermesh with the arbor.

The action of the brake, then, by means of the bar L, actuating the toggle-arms K^1 K^2 L^1 L^2, lowers the guide-plates D with the rack-bar C, the movement of the cam N causing the point N^2 to strike downward the toe Q^1 of the cam Q, thus bringing the toe Q^2 directly against the bend T^1 of the bar T, and the other end in contact with the piece C^1 of the rack C, and causing the teeth to engage with those of the arbor.

The same movement which, when the car car is running in one direction, throws the rack into gear with the arbor, releases it when it is running in the other.

The raising and lowering of the rack-bar may be operated by the pull of the horses in starting the car.

This invention may also be applied to railway-cars, and will be found a very valuable adjunct to the steam and vacuum brakes now employed, especially in shunting, where the cars have to be often detached and recoupled. It may also be used with advantage in some sorts of machinery, especially where a train of wheels are to be started.

Having thus described my invention, what I claim as new, and wish secured by Letters Patent, is as follows:

1. The combination of the plates D, carrying the rack-bar C, distance-pieces F, and guides *f*, all working in the pillow-blocks G, or any part of the frame of a cylinder, as and for the purposes set forth.

2. The combination of the cam N, cam O, link O^1, sliding bar L, toggle-arms K^1 K^2 L^1 L^2, the whole being operated by the action of the brake, for the purpose of raising and lowering the plates D, substantially as set forth.

3. The combination of the cam N, cam P, bent arm S, and bar T, the whole receiving motion from the brake, and operating the rack-bar C, substantially as and for the purposes described.

4. The combination of the cam N and cam Q with the bar T, the whole actuated by the brake, and operating the rack-bar C, as and for the purposes set forth.

Montreal, 18th day of April, 1876.

ET. SALOMON.

Witnesses:

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