L. RUSSELL.

CAR-STARTER.

No. 190,909. Patented May 15, 1877.

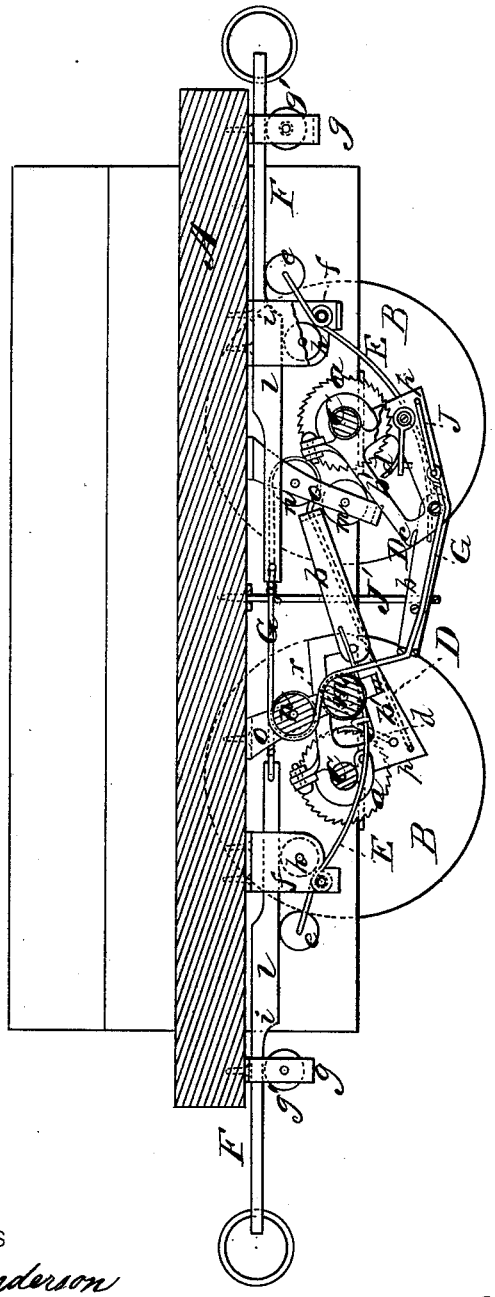

Fig 1

WITNESSES

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UNITED STATES PATENT OFFICE.

LESTER RUSSELL, OF OTSEGO, MICHIGAN, ASSIGNOR OF ONE-HALF HIS RIGHT TO CHARLES A. RUSSELL, OF SAME PLACE.

IMPROVEMENT IN CAR-STARTERS.

Specification forming part of Letters Patent No. **190,909**, dated May 15, 1877; application filed November 18, 1876.

To all whom it may concern:

Be it known that I, LESTER RUSSELL, of Otsego, in the county of Allegan and State of Michigan, have invented a new and valuable Improvement in Car-Starters; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a longitudinal vertical section of my improved car-starter.

This invention has relation to improvements in car-starters, the object of which is to relieve the draft-animals of the initial strain incurred in overcoming the inertia of the car and its load; and it consists in the arrangement and novel construction, in connection with the axle of a car having a ratchet-wheel keyed thereon, of a sectional jointed arm, vibrating vertically on the axle, extended to the rear, and carrying in its front lower end a pawl, which is actuated to engage with the said ratchet-wheel by means of a vibratory lever, having its bearings in a hanger in front of the axle-tree, which lever is operated to throw the pawl into engagement with the said ratchet-wheel through the medium of an endwise-movable shouldered draft-bar, having a chain secured to its rear end, passing over and around pulleys, and secured to the front end of the pawl-carrying arm.

It also consists in forming the pawl-carrying lever in two sections, whereby the vibratory action of the said lever is greatly extended and the apparatus rendered more effective, all as hereinafter shown and described.

In the annexed drawings, the letter A designates an ordinary street-car; B, the transporting-wheels, and C the axles. Axle C has keyed upon it a metallic ratchet-wheel, *a*, the object of which will hereinafter appear. D represents a vertically-vibrating arm or lever, having its bearings on axle C, and extending rearwardly toward the center of the car. This operating-arm is formed in two sections, *b b'*, the former being pivoted to the latter, and prevented from undue upward vibration by suitable stop-lugs *c*. *d* represents a vertically-vibrating pawl, having its bearings in the sides of lever D below the ratchet-wheel, and in its normal position hanging free therefrom. This pawl is provided with an arm, *r*, extending out from it, and overlying a vertically-vibrating rod, E, having its bearings in a stirrup, *f*, depending from the car-body in front of the axle. This rod will be preferably of spring-steel, and will carry in its front end an anti-friction pulley, *e*, bearing against and supporting an endwise-movable draft-bar, F. This draft-bar is guided at its front end by a bracket, *g*, carrying an anti-friction pulley. *g'*, and at or near its rear end by a pulley, *h*. The draft-rod will have an enlarged rear portion, *l*, connected with its front part by means of a beveled or inclined shoulder, *i*.

J represents a yoke secured to the front lower end of the pawl-carrying arm or lever, to which is attached an operating chain, G. This chain extends the whole length of the arm, and passes through an eye in its free end. It then extends upward in front of and over a pulley-wheel, *m*, thence backward around and in rear of a second pulley, *n*, and, being carried over the same, is extended to the front, and is secured to the rear end of the draft-rod. Pulleys *m* and *n* will be preferably mounted in an inclined hanger, *o*, the one above the other.

When the horse is started the draft, in the first instance, will extend the draft-bar. This movement will cause the anti-friction wheel *e* to descend the inclined or beveled surface *i*, thereby depressing the front end of rod E, raising its rear end, and, through the medium of arm *r*, throwing the pawl into engagement with the ratchet. At the same time the pawl-carrying arm will be drawn upward by chain G until its free end has passed upward beyond the lower pulley *m*, above described. After passing above pulley *m* it will be straightened out, because of the rearward position of pulley *n*, thereby increasing the vibratory movement of the said pawl-carrying arm, and consequently giving increased rotation to the axle. When the arm has become straightened the actuating-pawl, through this straightening, will be disengaged from the

ratchet-wheel, and the car proceed on its way without interference therefrom. When the car is stopped the pawl-carrying arm will descend automatically into the position shown in Fig. 1, and will thus be set ready for the next start. The stop-lugs before described, being upon the upper edge of section *b'* of the pawl-carrying arm, will prevent the outer section from undue vertical vibration, but will offer no obstacle to the straightening out of the arm aforesaid.

In practice I shall use a device of this nature upon each axle, and the vibratory pawl-carrying arms will be supported in a stirrup, J', so that, should the chain break, the said arms will be sustained and prevented from dragging on the ground.

As shown, the heel of the section *b* of the pawl-carrying arm projects considerably below the axle; and the said section being angular in its general form, and the yoke being pivoted below the pawl, at the lower end of this heel, the following desirable results will be attained when the draft is applied: At the moment of starting, when the inertia of the car is to be overcome, the full leverage of the pawl-carrying arm will be obtained, the said arm, though jointed, being, to all intents and purposes, rigid because of the stop-lugs *c* above mentioned. The inertia being overcome, the arm will be straightened out, and its free end will be raised above the pulley *m*. The leverage will then be transferred to the joint of the sections *b b'* of the arm, and finally to the lever *p*, formed by the heel of the said section *b'*, thus obtaining a power gradually decreasing as the necessity of the said power decreases, and increasing the rotation of the axle.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the axle C, having a ratchet-wheel keyed thereon, the vertically-vibrating arm D, having pawl *d*, with arm *r*, the vertically-vibrating rod E, having pulley *e* in its front end, the endwise-movable draft-rod, having inclined or beveled shoulder *i*, chain G, and inclined pulleys *m n*, substantially as specified.

2. The combination, with the lever D, vibrating vertically on a car-axle, and the ratchet-wheel *a*, of a pawl mounted in the said lever, and a vibrating lever, E, adapted to throw the said pawl into engagement with the ratchet-wheel, substantially as specified.

3. In a car-starting mechanism, the jointed vertically-vibrating lever D, having a pawl, *d*, mounted therein, adapted for use substantially as specified.

4. In a car-starting apparatus, the arm D, having a pawl, *d*, and composed of jointed sections *b' b* and a heel, *p*, on the former, at right angles to its length, combined with a chain secured to the lower end of the heel, passing over pulleys *m n*, and secured to the rear end of the endwise-movable draft-bar, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

LESTER RUSSELL.

Witnesses:
L. H. COWLEY,
WALTER C. MASI.