

A. CHRISTIN.  
Car-Starter.

No. 213,872.

Patented April 1, 1879.

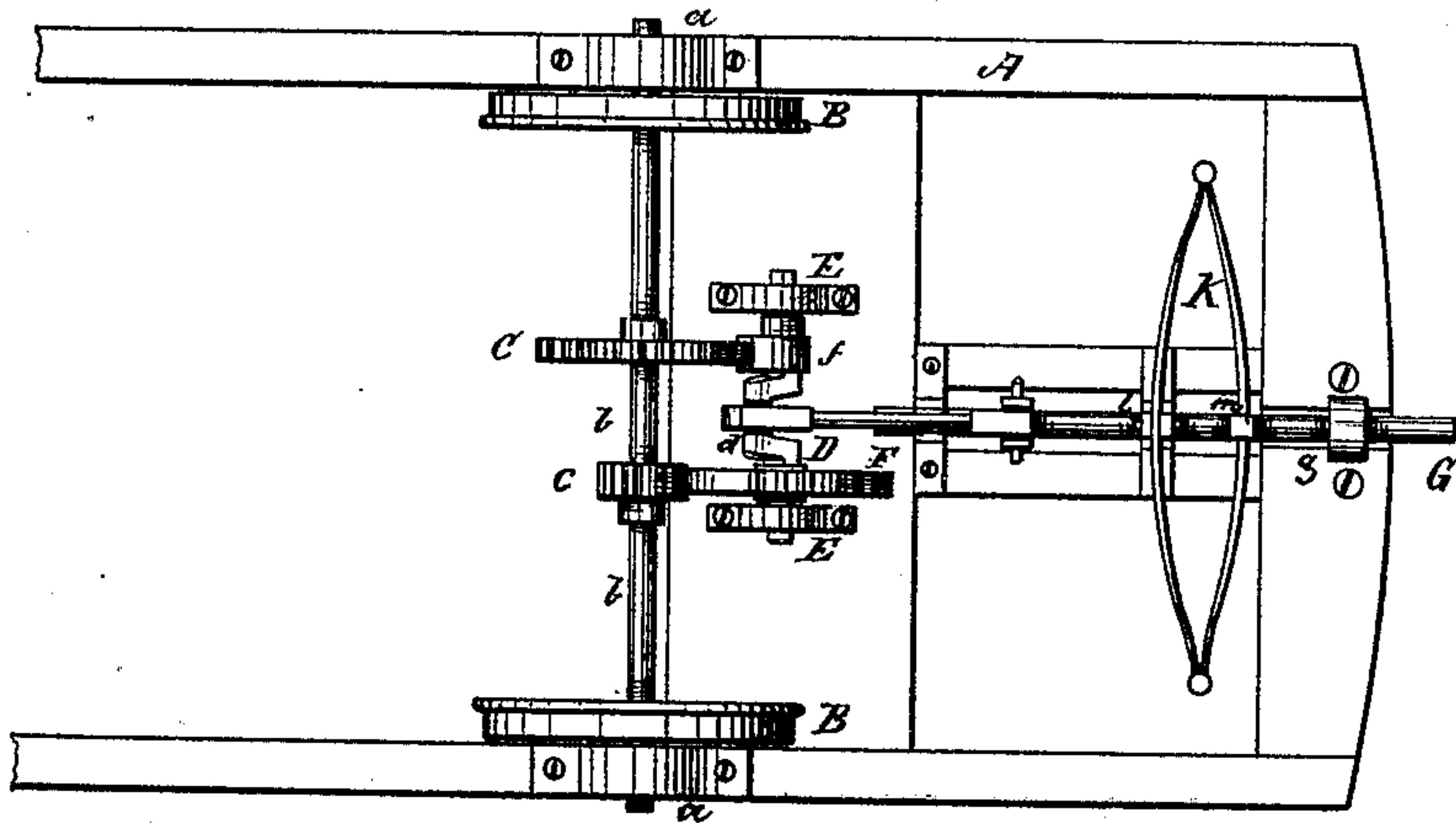


Fig: 1.

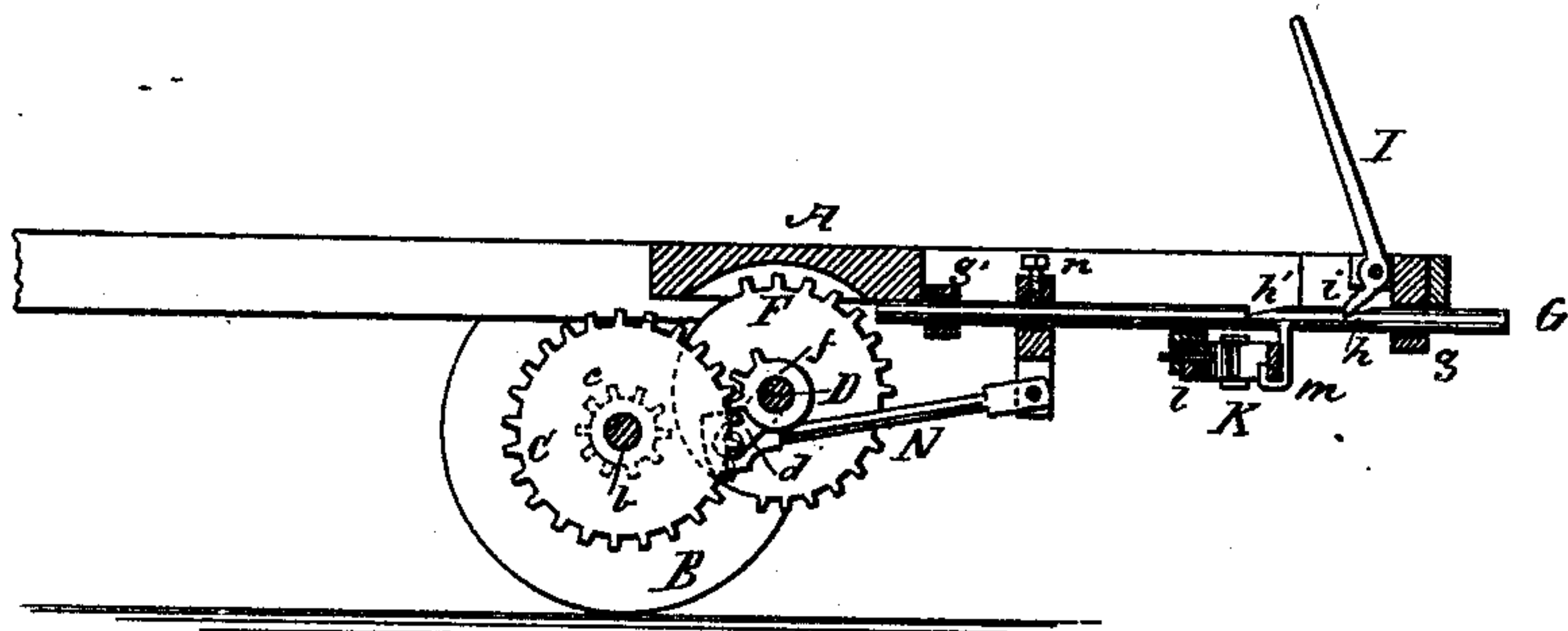


Fig: 2.

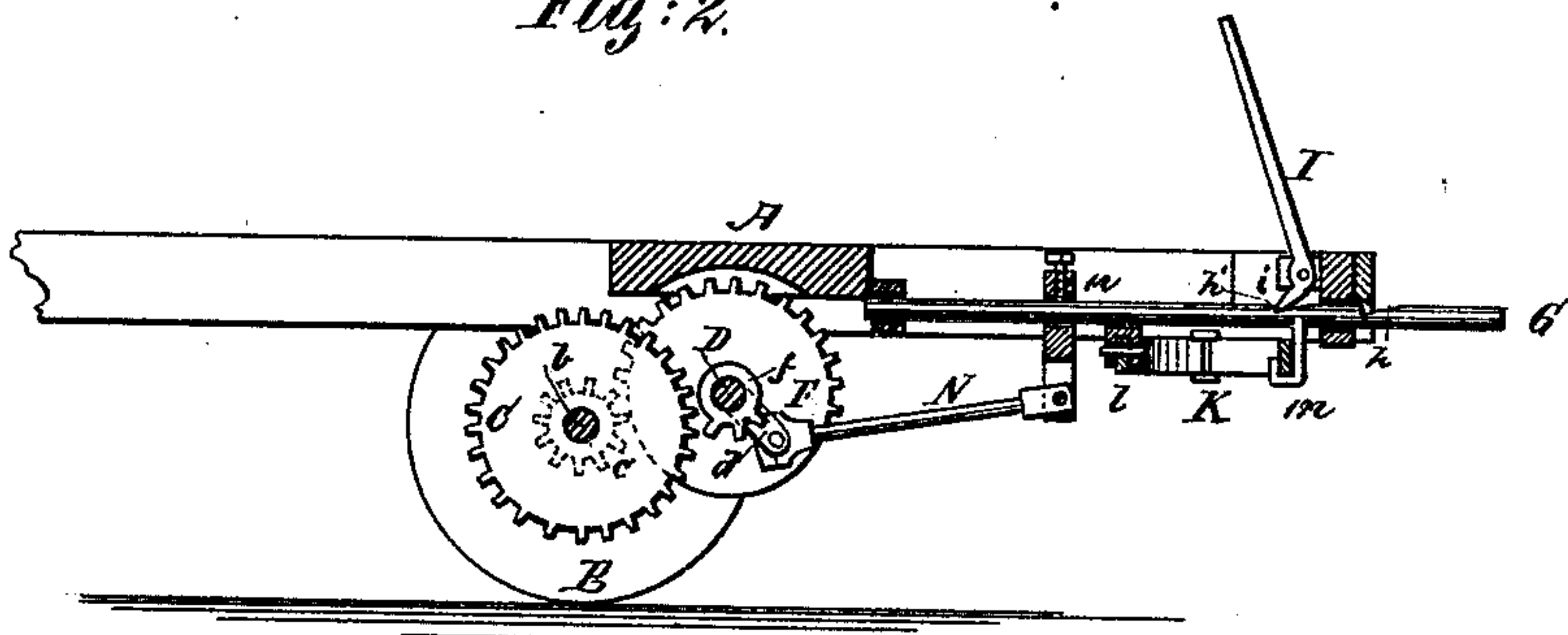


Fig: 3.

Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN CAR-STARTERS.

Specification forming part of Letters Patent No. **213,872**, dated April 1, 1879; application filed February 17, 1879.

*To all whom it may concern:*

Be it known that I, ARTHUR CHRISTIN, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Car-Starters; and I do declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification.

The nature of my invention relates to devices for assisting in the starting of a street-car from a dead stop, thereby avoiding the sudden heavy strain on the shoulders of the horses, which invariably follows the starting of a loaded car; and it particularly belongs to that kind of devices in which the momentum of the car when its motion is arrested is made to accumulate a starting force.

The invention consists in the peculiar arrangement of the various parts, as more fully hereinafter described.

In the drawings, Figure 1 represents a bottom view of one end of a car arranged with my improvements; Fig. 2, a longitudinal sectional view of the car with the attachment in position for starting; and Fig. 3 represents a similar view of the car with the attachment in its idle position, as it will be when the car is in motion.

Like letters in the several figures of the drawings indicate like parts.

A is the body-frame of the car, to which, in journal boxes *a*, is pivoted the axle *b*, carrying track-wheels B. Upon this axle *b* are mounted a gear-wheel, C, and a pinion, *c*, both provided with teeth around their entire circumference.

D is an auxiliary shaft, bent in its middle for forming a crank, *d*, and journaled in hanger-bearings E, which are secured to the under side of the car-body. A gear-wheel, F, of equal diameter with wheel C, is mounted upon shaft D so as to be in line with pinion *c*, with which its teeth will engage. This wheel F is provided with teeth on only a little over one-half its circumference, which teeth are in such a position relative to the crank *d* that while they occupy the upper semicircle of the wheel the said crank is pointing forward and stands a little below the horizontal line of shaft D.

A hub, *f*, is mounted upon shaft D so as to be in line with wheel C, and is provided with three or more consecutive cogs of equal pitch with the teeth of wheel C to engage therewith, and these cogs are located about centrally opposite to the tooth portion of wheel F, so that while the teeth of one pair of wheels, *c* F, are engaged, the other pair, C *f*, are not, and vice versa, and with a sufficient blank space to both wheels F *f*, relative to the wheels C *c*, so that neither wheel will be engaged when the crank *d* is occupying a position pointing forward and downward at about an angle of forty-five degrees.

G is the draw-bar, supported in boxes *g g'* under the car-platform, and arranged to have a longitudinally-sliding movement. The upper face of this bar has two notches, *h h'*, for engagement with a pawl, *i*, pivoted in the car-platform, and attached to a hand-lever, I, or a treadle, which is to be in easy reach of the driver.

An elliptic spring, K, is secured with its rear side to the car-body by a bracket, *l*, and its forward side is connected with the draw-bar G by means of a hook-bracket, *m*. A collar, *n*, is mounted upon the draw-bar G, and has a bifurcated pendant, which is connected with the crank *d* of shaft D by a pitman, N.

Having thus described the construction and arrangement of the several parts, I will now proceed to explain the operation of the apparatus.

While the car is moving the pawl *i* will be engaged with the notch *h'* of the draw-bar G, locking the same in the position for holding the crank *d* of shaft D down at a forward angle, when the blank faces of both wheel F and hub *f* will meet the teeth of wheel C and pinion *c*, and the axle *b* will be unimpeded, as shown in Fig. 3; but as soon as the driver intends to stop the car he raises the pawl *i* either by taking hold of hand-lever I or by setting his foot upon a treadle connected with said pawl, thereby liberating the draw-bar G, which, by a slight pull of the horses or by the expansion of the spring K, will turn the crank-shaft D sufficiently to cause the engagement of the teeth of wheel F with pinion *c*, which will turn the crank-shaft about five-eighths or



three-quarters of a revolution, thereby pulling the draw-bar G backward and contracting the spring K, when the pawl *i* will engage with notch *h* of the draw-bar, and will lock the same in its acquired position. By this time the cogs of wheel F will be on the side below the shaft D, and entirely clear of pinion *c*, and the first cog on hub *f* will be on the point of engagement with the teeth of wheel C, as shown in Fig. 2, when the car will be held at a dead stop.

As soon as the driver intends to start the car again, at the moment he starts the horses he will raise the pawl *i*, when the expansion of spring K will act upon the crank-shaft D, and the cogs of hub *f* will turn the wheel C, giving an impulse to car-wheels B, and thereby setting the car in motion.

The great advantage of this device is, that by the peculiar arrangement of the sectional gearing on the crank-shaft in connection with the gearing on the axle the compression of the spring requires but little power, the leverage of said wheels being in favor of an easy and powerful movement for such operation, while for starting the car the action of such leverage on the wheels is reversed, and the spring exerts from six to nine times more force upon the car-wheels than the car-wheels had to exert for contracting said spring. This device is simple in its construction, and cannot easily get out of order. It is attached to the car in a position where it is entirely out of the way, and yet convenient for lubricating and repairs.

Instead of employing toothed wheels, friction-wheels, properly constructed, may be substituted in their places.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with the car-axle *b*, having wheel and pinion C *c*, the crank-shaft D, having sectional wheel and pinion F *f*, and being suitably connected with the sliding draw-bar G, acting upon a spring, K, and arranged to be locked in its two opposite positions by the foot or hand of the driver, substantially as and for the purpose set forth.

2. In combination with the car-axle *b*, having wheel and pinion C *c*, the crank-shaft D, having sectional wheel and pinion F *f*, and being suitably connected with the draw-bar G, acting upon spring K, and having notches *h h'*, for locking the same by a pawl, *i*, arranged to be operated by the driver's hand or foot, the whole to be constructed and arranged to operate substantially in the manner set forth.

3. The draw-bar G, having notches *h h'*, pawl *i*, spring K, and pitman N, in combination with crank-shaft D, having sectional wheel and pinion F *f*, and the axle *b*, having wheel and pinion C *c*, the whole being constructed and arranged to operate as and for the purpose set forth.

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Witnesses:

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