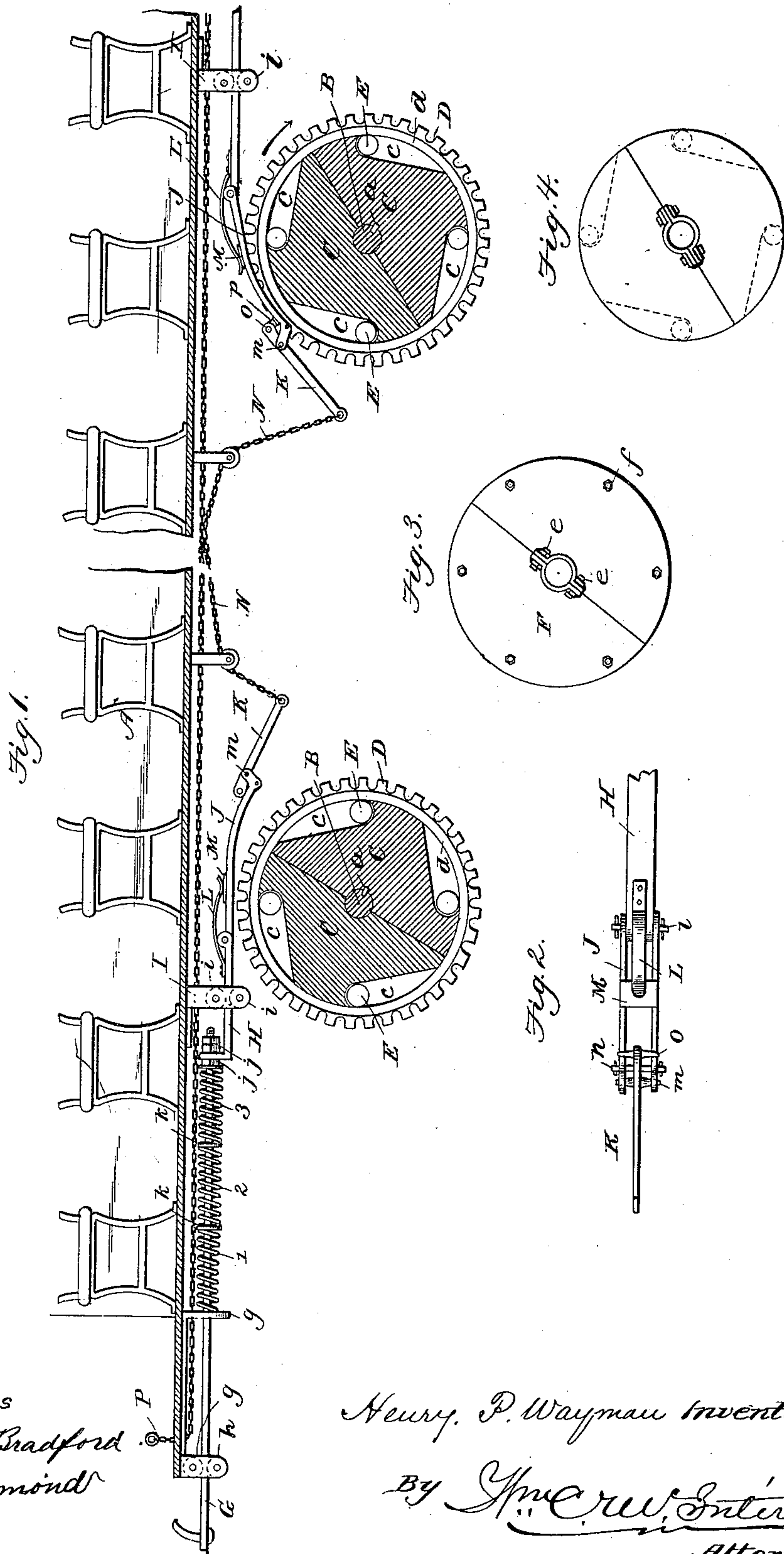


(No Model.)

H. P. WAYMAN.
CAR STARTER.

No. 459,803.

Patented Sept. 22, 1891.



Witnesses
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UNITED STATES PATENT OFFICE.

HENRY P. WAYMAN, OF TRENTON, NEW JERSEY.

CAR-STARTER.

SPECIFICATION forming part of Letters Patent No. 459,803, dated September 22, 1891.

Application filed April 21, 1891. Serial No. 389,794. (No model.)

To all whom it may concern:

Be it known that I, HENRY P. WAYMAN, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Car-Starters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in car-starters, and particularly to that class illustrated and described in Letters Patent No. 376,356, granted to me on the 10th day of January, 1890.

My present invention has for its object to improve the construction of the details shown in my patent above referred to and to render such construction more durable and effective.

With these ends in view my invention consists in the peculiarities of construction and arrangement of parts, hereinafter more fully described and specifically claimed.

In order that those skilled in the art to which my invention pertains may know how to make and use the same, I will proceed to describe the construction and operation, referring by letters to the accompanying drawings, in which—

Figure 1 represents a vertical longitudinal section of an ordinary summer street-car with my improvements applied. Fig. 2 is a detail plan view of the link connection. Fig. 3 is a side view of the cover or dust-disk which conceals the clutch mechanisms and protects the same from dust and dirt, and Fig. 4 is a plan view of the two-part collar forming the hub of the friction-clutch mechanism and showing the manner in which the two parts are secured together and connected to the axle.

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

A represents an ordinary street-car, of any desired size or form, mounted upon the wheels and axles similar to those employed on steam-roads.

Centrally arranged upon the end axles B is a two-part hub C, which is secured against rotation or is fixed to the axle by a spline *a*, and the two parts of said hub are secured one with the other by means of lugs and bolts, as shown at *b*, Fig. 4 of the drawings, the object

of making this hub in two parts being to permit of its placement upon the axle without removal of the car-wheel, which would of course be necessary were the hub made in one piece. The parts of this hub C are each cut away on their peripheries to form, preferably, two recesses *c*, the bottoms of said recesses extending chordwise to the edge and the rear end of said recesses terminating in a curved shoulder, as clearly shown in Fig. 1.

D is a ring or collar, the periphery of which is provided with cogs or grooves, as clearly shown, and the inner circumference fitting comparatively loosely around the two-part hub C.

E are rollers or balls of steel or iron, case-hardened, slightly less in diameter than the greatest depth of the inner end of the recesses *c*, at which point they are free to rotate without in any manner locking (by friction) the ring or collar D to the two-part hub C. This ring or collar D is circumferentially-recessed on each side, inside of the cog or grooves, as seen at *d*, to receive the edge of two-part guard-plates F, which, being placed around the axle and within the recesses *d*, are secured in position by lugs or bolts *e* firmly to the axle B, in which case said plates rotate with the axle, or they may be secured directly to the collar D by bolts and nuts *f*, in which case said plates would move only when said collar was partially rotated, and the car-axle would rotate independently of the plates. The plates F thus constructed and arranged can be easily applied without removing the car-wheels, and when in place completely conceal the hub C, short cylinders or balls E, and the slight space between the exterior of the hub and the inner edge of the collar, thus not only keeping all the parts of the clutch mechanism in proper relation, but at the same time preventing the ingress of dust and dirt.

Beneath the body of the car is arranged a draft-bar G, to the outer end of which the horses are attached in the ordinary manner. This draft-bar is arranged to slide freely in a longitudinal direction in hangers or angle-arms *g*, in one or both of which may be arranged anti-friction rolls *h*. (See Fig. 1.) The rear or inner end of the draft-bar G passes through the upturned end of a short flat bar H, mounted between anti-friction

rolls *i* in a hanger *I*, and is adjustably secured by screw-nuts *j*.

Between the upturned end of the bar *H* and nearest hanger *g* and surrounding the draft-bar *G* are arranged two or more spiral springs 1 2 3, with collars *k* placed between and separating said springs, which are of different degrees of spring power or strength. The weakest spring 3 is preferably arranged nearest to the bar *H*, spring 2 being somewhat stronger, and 1 the strongest of the three, the combined and individual tension of the three springs being controlled by increasing or diminishing the distance between the hanger *g* and the upturned end of the bar *H* by the movement of the adjusting-nut *j* on the end of the draft-bar *G*.

To the inner end of the bar *H* (see Fig. 2) is secured by a pivot or hinge joint *l* one end of a link *J*, the opposite or free end of which is fashioned into a cross-bar *m*, adapted to enter and interlock with the cogs or recesses in the exterior periphery of the ring or collar *D*. To the free end of this link *J* is connected by a pintle or bolt *n* an arm *K*, the short end of which is formed with a cross-piece *o*, adapted to bear against the upper surface of the link *J*, and with a short spur *p*, (see Fig. 1,) adapted to be brought in contact with the teeth of the cogs on ring *D* when the free end of arm *K* is lifted, as will be hereinafter more fully explained.

Bridging the joint *l* between the bar *H* and link *J* a flat spring *L* is arranged, one end being rigidly secured to the bar *H* and the opposite end pressing upon a cross-bar *M* and tending to hold the outer or free end of the link always in engagement with the notches or cogs of the collar or ring *D*.

N is a chain or cord, which is connected to the outer or free end of the lever-arm *K* and passing through suitable guide-pulleys in hangers on the under side of the car passes up through the platform within reach of the driver or conductor, and when said cord is pulled the first effect is to vibrate the arm *K* upon its hinge-joint *m* and cause the spur *p* to come in contact with the crown of one of the teeth in the ring or collar *D*, and continued strain upon the cord will cause the arm *K*, acting with its spur *p* as a fulcrum, to lift the cross-bar *m* of the link *J* out of engagement with the notch in the ring *D*, and continuation of strain will bring the cross-piece *o* in contact with link *J*, and arm *K* and link *J* will be drawn up into the position shown in the left-hand side of Fig. 1, leaving the clutch mechanism entirely free, while when the cord *N* is released the arm and link will be at once forced into a downward and locking position, as shown on the right-hand side of Fig. 1.

When a "double-ender" car is used—such as I have illustrated in the drawings—the cord *N* may connect the free ends of the two arms *K*, and at a point equidistant from the ends of said arm the cord *N* may be connected

with an operating chain or cord *P*, which will operate to release either link from contact with the clutch-ring accordingly as it is pulled in one or the other direction, it of course being understood that when the car is going in the direction of the arrow the forward mechanism is kept in engagement, as shown, and the rear mechanism released, as shown.

When the car is at a standstill and the clutch mechanism in the condition shown at the right-hand side of Fig. 1, the pull of the horses will be exerted upon the spring draft-bar *G*, and the variable springs 1 2 3 first yielding avoids the usual shock or jerk given to the car. The bar *H* is then drawn forward slightly, and pulling with it the link *J*, which is in engagement with the notched ring or collar *D*, the latter is correspondingly rotated in the direction of the curved arrow and necessarily confines or pinches the rollers or balls *E* between the inner surface of the ring and the bottom of the recesses *c* of the hub *C*, and consequently the ring and hub become locked, and the power of the horses is then applied through the ring and hub direct to the axle with all the beneficial effect of a lever-force.

While I have shown and described the two-part hub *C* as clamped to the axle by lugs and bolts to prevent lateral movement or shifting of the same, it will be understood that when the guard-plates *F* are similarly secured to the axle it will be unnecessary to also clamp the hub-pieces.

When the extra power required for starting the car has been exerted and the car has been set in motion, the reaction of the springs 1 2 3 will cause the draft-bar *G* and link-bar *H* and its connections to move backward and again into engagement with the ring or collar *D* in proper relation to again rotate the axle and wheel after the car has stopped. The ordinary brake mechanism is of course employed to control the speed of the car; but it will be seen that in the event of the brake mechanism suddenly becoming inoperative, especially on dangerous grades, that all accident may be avoided by the reverse action of the clutch mechanism used for starting the car.

Having described the construction and operation of my improved car-starter, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the axle *B* and two-part hub *C*, provided with recesses *c*, the rollers or balls *E*, ring or collar *D*, provided with peripheral notches and circumferential recess *d*, and the two-part guard-plates *F*, all arranged to operate substantially as and for the purpose set forth.

2. In combination with the axle *B*, hub *C*, rollers or balls *E*, and ring or collar *D*, constructed and arranged to form a clutch mechanism, the link *J*, connected to the longitudinally-movable draft-bar and provided with

the spring L, and pivotal releasing lever-arm K, substantially as hereinbefore set forth.

3. The lever-arm K, pivotally connected to the free end of the link J and provided with the cross-arm *o* and spur *p*, substantially as and for the purpose set forth.

4. In combination with the draft-bar G, bar H, and hangers *g*, the coiled springs 1 2 3, of varying tensions, separated by collars *k*, and the adjusting-nuts *j*, substantially as and for the purposes hereinbefore set forth,

5. In combination with the clutch mechanism, the draft-bar G, link J, and arm K, the operating cord or chain N, substantially as and for the purpose set forth.

6. In combination with two sets of clutch mechanisms, one on the forward and one on

the rear axle of a street-car, two draft-bars, two links J, and two lever-arms K, a cord or chain N, connecting the free ends of the two arms K and connected centrally to a common operating chain or cord P, substantially as and for the purposes set forth.

7. In combination with a longitudinally-movable draft-bar for street-cars, a compound spring composed of coils of varying tensions and adapted to be adjustably confined in place, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY P. WAYMAN. [L. s.]

Witnesses:

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