(No Model.) 4 Sheets—Sheet 1.

J. E. BROWN.

CAR STARTER.

No. 301,476. Patented July 8, 1884.

Fig. 1

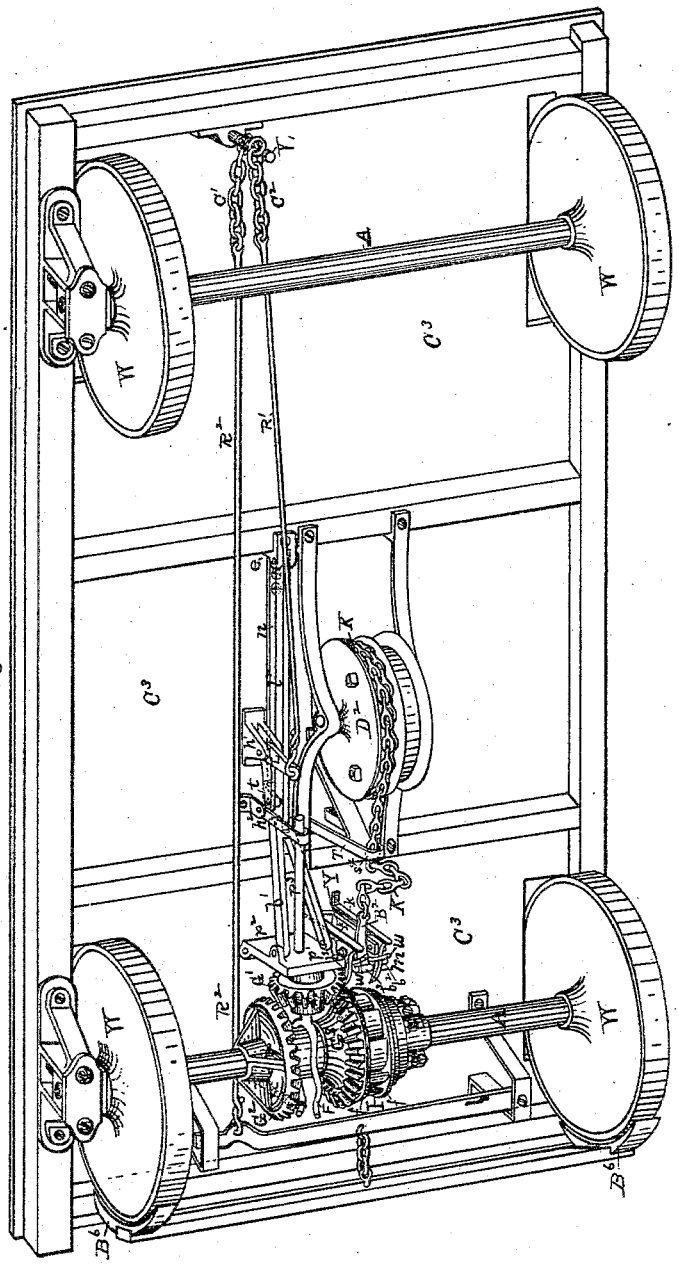
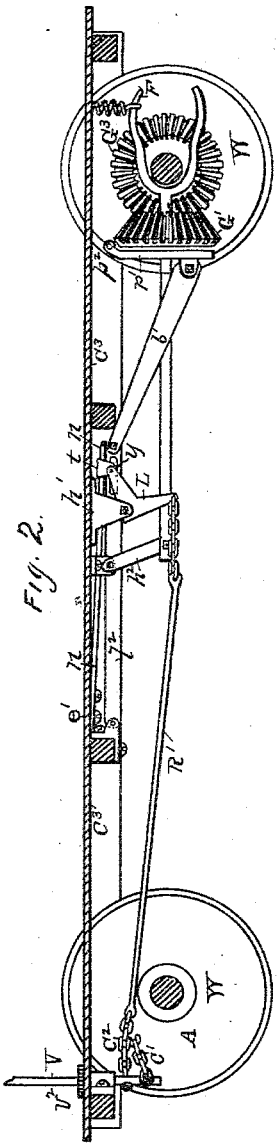


Fig. 2.



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N. PETERS. Photo-Lithographer. Washington, D. C.

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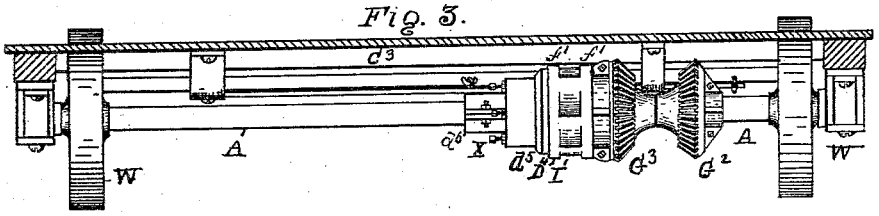
Fig. 3.



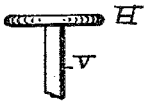


Fig. 4

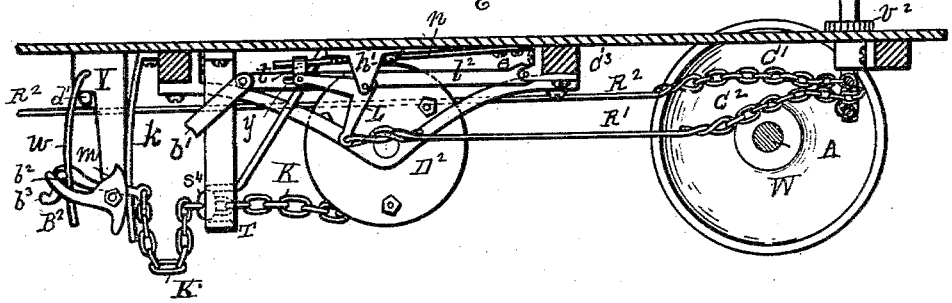
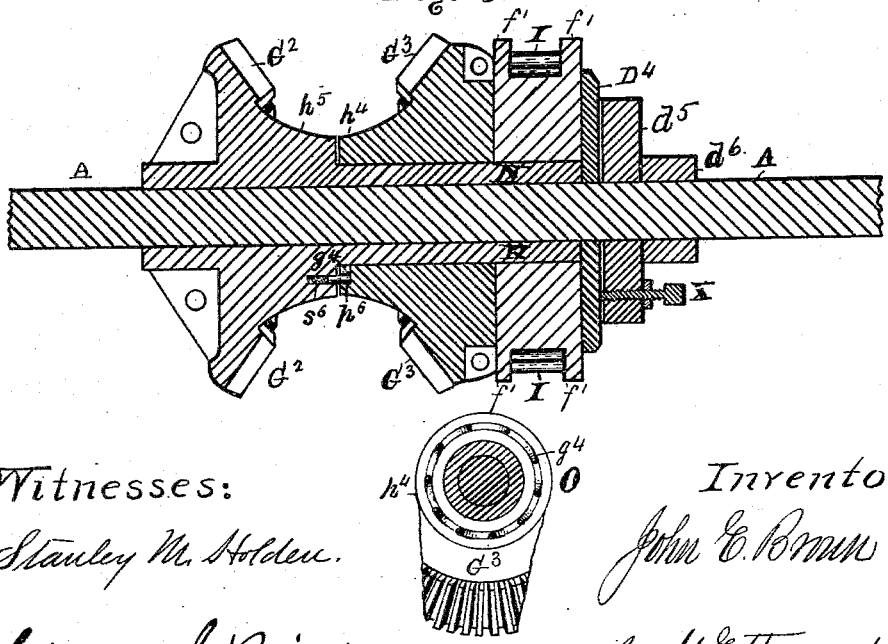


Fig. 5.



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(No Model.) 4 Sheets—Sheet 3.

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CAR STARTER.

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Fig. 6.

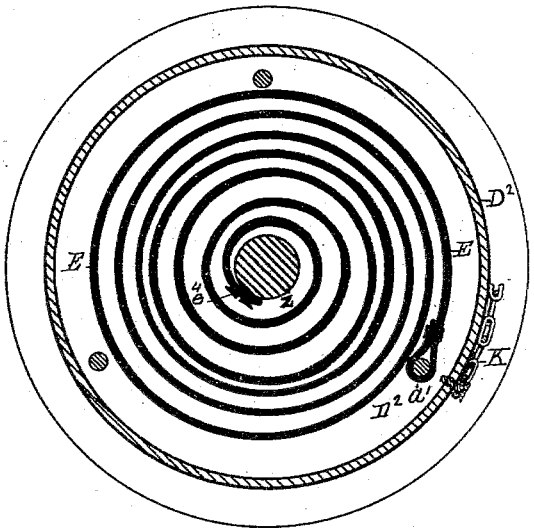
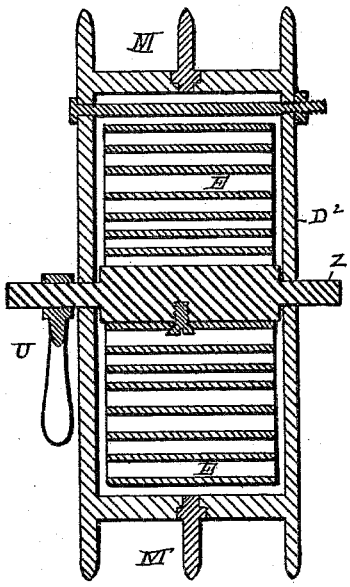


Fig. 7.



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(No Model.) 4 Sheets—Sheet 4.

J. E. BROWN.

CAR STARTER.

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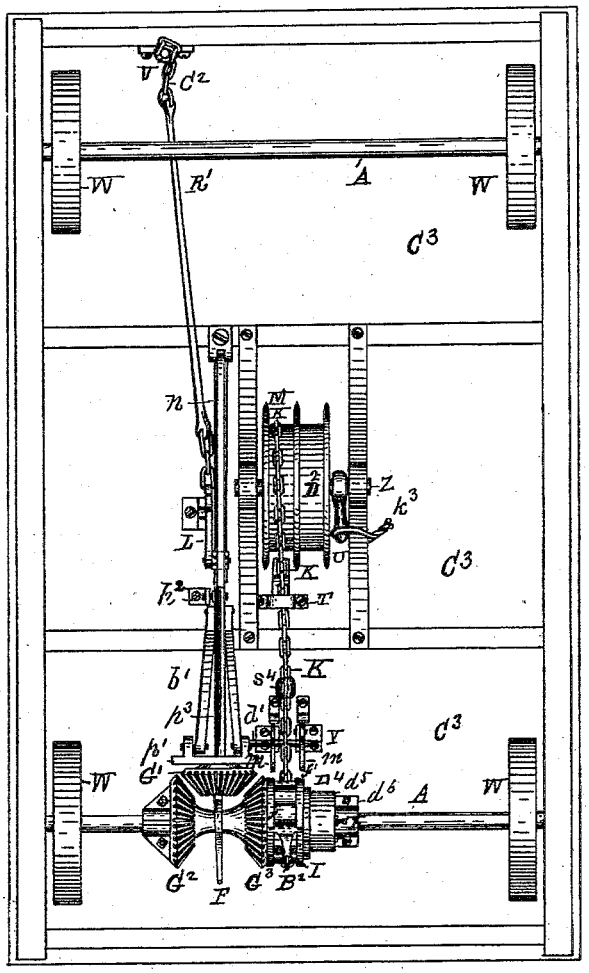
Fig. 8



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UNITED STATES PATENT OFFICE.

JOHN E. BROWN, OF LANSINGBURG, NEW YORK.

CAR-STARTER.

SPECIFICATION forming part of Letters Patent No. 301,476, dated July 8, 1884.

Application filed May 3, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. BROWN, of the village of Lansingburg, county of Rensselaer, State of New York, have invented a new and useful Improvement in Horse-Car-Starter Mechanism, of which the following is a specification.

My invention relates to improvements in that class of mechanism which are used upon horse-cars to start them after having been stopped independently of the animals that draw them.

The object of my invention is to have the momentum of the car when being stopped used as a means to store itself up, and when released have it act to start the car; in fact, making the storage of the momentum the means used to stop the car without the aid of brakes, and to so operate the mechanism that stores up the momentum and releases it to start the car from one and the same hand-wheel and vertical shaft.

Accompanying this specification, to form a part of it, there are four plates of drawings, containing eight figures, illustrating my invention, with the same designation of its parts by letter-reference used in all of them.

Of these illustrations, Figure 1 shows a perspective of the under side of the car, and the attached mechanism, with the side of the car that is toward the sight turned up on an incline. Fig. 2 shows a side elevation of that part of the mechanism connected with the vertical hand-shaft and wheel by which the parts are put in gear to so actuate the momentum of the car as communicated from one of its axles to wind up the spring. Fig. 3 shows an end elevation of the car-platform, the axle, the beveled gears upon a wheel that is secured to the latter, the ratchet-wheel into which the chain connected with the spring is made to hook, the beveled gears which move the ratchet-wheel, and a friction-clutch arranged to make the ratchet-wheel engage with that part of the latter on which the gears are placed. Fig. 4 shows a side elevation of the hand-wheel and the connecting-levers by which the said hand-wheel, after having been turned to throw the coupler-gear out of engagement, may be further turned to operate an ordinary brake to stop the car when the latter is being moved by the recoil-force of the spring, immediately after having been started thereby. Fig. 5 is a longitudinal vertical section taken through the car-axle, the ratcheted wheel, the beveled gears which move the latter, the beveled gears on a wheel that is secured to the car-axle, and a friction-clutch upon the ratchet-wheel. Fig. 6 is a transverse section of the spring used to store up the momentum of the car, and showing also a section of the drum inclosing the spring and the fixed bar to which the inner end of the spring is attached, and on which the drum turns. Fig. 7 is a diametrical section taken through the coil of the spring, the drum inclosing it and the bar to which the inner end of the spring is attached, and on which the drum turns. Fig. 8 is a plan view of the bottom of the car and the attached mechanism.

The several parts of the mechanism, and those of a horse-car to which the former is attached, are designated by letter-reference, and their function is described as follows:

The letter C^3 indicates the car-bottom, the letters A the car-axles, and W its wheels.

The letter H designates a hand-wheel, and V its shaft, the latter being projected up through the car-floor in the usual manner, and held in place where passing through the car-floor by the plate v^2, arranged on the shaft above the platform.

The letters C′ and C^2 indicate chains, one end of each of which is attached to the vertical shaft V, below the car-bottom, so that as the said shaft is turned the chains are wound thereon.

To the end of the chain C^2 (the other end of it being attached to the shaft V, as before described) there is connected a rod, R′, and at the other end of the latter it is attached by a pivoted connection to the angular turn-lever L, the angular corner of the latter being pivoted to the lower end of the hanger h', with the other end of said angular lever L, making a pivoted connection with the lever l^2. The other end of this lever l^2 is pivoted to the end of the forked lever b', and the latter at its other end is pivoted to the face of the plate p', which plate, at its upper end, p^2, is hinged to the under side of the car-bottom.

The letter G′ indicates a coupler gear-wheel

having beveled cogs, with its shaft or pintle p^3 projected from the face of this plate, the said coupler gear-wheel turning on said shaft or pintle, but not with it. At one end of this shaft or pintle, where passing on through the gear-wheel coupler, it is forked, as indicated at F, and at its other end, frontward of the hinged plate p', it rests in a hanger, h^2, the function of which forked end will be subsequently described.

With the foregoing parts constructed as shown and described, when the chain C^2 is, by means of the hand-wheel H, wound onto the vertical shaft V through the connection with the rod R′, angular turn-lever L, attached lever l^2, pivoted lever b', and the hinged plate p', the latter and the coupler gear-wheel G′ are moved forward; and when this hold or tension upon the hand-wheel is released from the connection so made, the said parts are returned to the position they were in before being acted upon by the said hand-wheel. By the action of the spring n, one end of which is attached to the car-bottom at e', and the other end of which spring passes through a stirrup, t, which is by a slotted pivotal connection attached to said angular lever L and lever l^2, as indicated at y, the foregoing factors being employed to connect and disconnect the mechanism that stores up the momentum of the car in stopping the latter.

The letter I designates a ratchet-wheel that is made with perimetral rim-flanges f' f', that subtend the pins or teeth which form the ratchet, and so as to produce outside of the latter an encircling flange-trough to receive therein an encircling chain, K, that connects with a coil-spring, E, said chain being adapted to hook into said ratchet-wheel, as will be subsequently described.

The letters G^2 and G^3 indicate two beveled gear-wheels, which are separated from each other. That being designated at G^3 is used when the gear-coupler wheel G′ is connected to actuate the ratchet-wheel I to wind up the spring. This gear-wheel G^3 moves on a bearing that is sleeved onto the axle of the car, and the gear-wheel G^2, to which said sleeve N is attached, is keyed to the said axle to move with it and be moved by it. When the coupler gear-wheel G′ is in connection with the hinged plate p' moved forward, as before described, by turning the hand-wheel, then the forked arms F, which as divided pass each side of the hubs of the said gear-wheels G^2 and G^3, thus guide said coupler gear-wheel G′ to make a geared connection therewith, and said coupler gear-wheel receiving power from the wheel G^2 as the latter receives it from the axle, the coupler in opposite rotation transmits it to the wheel G^3, and the latter actuates the ratchet-wheel I to wind up the chain and spring E.

The letter Y designates a hanger attached to the under side of the car-bottom, to which hanger at its bottom and at each side thereof there is pivoted an angular form hook-holder, m, the horizontal arms of which are curved downwardly and upwardly, and at the top of said hanger Y there are pivoted two fingers, w w, each of which from where attached is extended downwardly between the angular form hook-holders m and the said hanger Y. Upon the back of this hanger Y there are two leaf-springs, k k, which at their upper ends, where nearest the car-bottom, are attached to said hanger with their lower ends against the flat backs of the said angular form hook-holders m, and so that the latter are moved on their pivoted end connection against the force of said springs k k.

The letter d' designates a bar that is attached to the front face of the plate p', and which bar projects laterally from the side of said plate, so as to be back of the said fingers w w.

The letter B^2 designates a hook on the end of the chain K, and this hook is made with the laterally-extended arms b^2 b^2 and the intermediately-arranged and downwardly-projected prong b^3, the said arms being for the said hook to engage with, so as to rest upon the curved arms of the angular form hook-holder m when not engaged with the ratchet-wheel.

The parts thus constructed to hook the chain K′ onto the ratchet-wheel operate as follows: When the plate p' is moved forward, as before described, to connect the gear-coupler G′ and the gear-wheels G^2 and G^3, the horizontal bar d', attached to said plate, is also moved at the same time, and this bar engages with, so as to move forward, the two fingers w w, and the latter in sequence move out the hook B^2 on the angular form-holders until the prong of the hook catches into one of the teeth of the ratchet-wheel I, which, as actuated by the axle of the car through the gear-wheels G^2 G^3 and the coupler-gear G′, winds up the chain K and the spring E, the chain as wound by the ratchet being in the groove formed by its rim-flanges f' f'. When the tension producing this result is released from the hand-wheel H, then the accumulated force stored up in the spring E by the stoppage of the car is expended on the axle of the car to move the latter forward. In the meantime, as the chain is unwound from off the ratchet-wheel onto the drum D^2, until the stop in the chain at s^4 reaches the staple T, the hook is also drawn back by the action of the spring and chain to rest on the arms of the hook-holders, that portion of the chain between the stop on the chain and the hook being slack and without tension. The spring E is a coil-spring, which at its inner end is attached to the bar Z, as indicated at e^4, and the outer end of the spring is attached to the inner side of the drum D^2, as designated at a', so that as the drum D^2 is turned on its bearings on the said bar Z, the spring is wound up thereby. On the outer edges of the drum there is formed an encircling trough, M, and the chain K is attached to the said drum at the bottom of this trough. By means of the crank-arm U on the bar Z the

spring E is in part wound up, so as to wind the chain K onto the drum under a state of tension between the stop s^4 on the chain where held by the staple T and where attached to the drum, when the crank-arm and shaft or bar Z are secured by a keeper, k^3. In this position, when the hook B^2 is connected to the ratchet, the latter acts upon the spring under a state of tension. The ratchet-wheel I and the gear-wheel G^3 both move together on the sleeve N, excepting when the tension upon the chain and spring as being wound onto the ratchet is greater than the face force of the friction contact, by which the adjacent sides of the said ratchet-wheel and the gear-wheel G^3 are held in contact by the clutch-plate D^4, bearing-plate d^5, and the set-screws X, arranged between said ratchet-wheel and a fixed collar, d^6, on the said sleeve N. This construction is so arranged to limit the amount of force to be stored up, and so that when this limit is reached, while the gear-wheel G^3 will continue to turn with its connections, the ratchet-wheel I will slip on its bearing on the sleeve N, and the relative capacity at which it will so operate is regulated by said plates and set-screws.

In the annex to Fig. 5, designated at O, there is shown an end view of the hub h^4 of the gear-wheel G^3, and a segmental part of its gears. This annex figure shows a ratcheted groove formed in revolution in the face of the hub, consisting of a series of inclines terminating in abrupt terminations, as indicated at g^4.

The letters p^6 indicate detent-pins, of which there are several, each of which has a backing spiral spring, s^6, with the latter, and the pin in each case arranged in a tubular-form opening made in the end face of the hub h^5 of the gear-wheel G^3, with said pins therein placed so as to come opposite the ratcheted groove g^4 in the face of the other gear-wheel. As thus arranged, when the gear-wheels G^2 and G^3 run in opposite directions the detent-pins in the hub of the gear-wheel G^2 run over the inclines in the ratcheted groove, so as to drop from off the abrupt terminations, and engage with the latter to prevent the reverse rotation of the gear-wheel G^3, and the ratchet-wheel I, which it operates. By this mechanism, when the chain is being unwound by the action of the spring, the whole force of the latter is exerted on the circumference of said ratchet-wheel I to turn the axle progressively, and thus to move the car ahead.

To the lower end of the vertical shaft V (arranged to be operated by the hand-wheel H, the chain C', and the rod R^2) there connects the ordinary brake, B^6, and this is used to stop the car, as follows: When the coupler gear-wheel has been released from engagement and the car started ahead by the combined action of the chain K, the spring, and ratchet-wheel, and it becomes necessary to stop the car suddenly, then the hand-wheel is turned in a direction the same that it is turned to disconnect the coupler, but is turned much farther, and enough so to bring the brake B^6 into contact with the car-wheel by winding the chain C' upon to said shaft V, a single turn of the said shaft being enough to release the coupler-gear, but it taking a number of turns in the same direction to put on the ordinary brake. Thus both methods of stopping the car can be operated from one and the same hand-wheel.

In driving horse-cars on an upgrade, when the car is stopped by the ordinary brake as generally used, the moment that the brake is released the car commences to run back, and this tendency the horses have to overcome before starting the car forward.

When a car containing my invention is stopped on an upgrade, and the coupler is released, the stored up force of the spring is always enough to hold the car if not strong enough to start it ahead on an upgrade, and the heavy strain upon the animals is thus avoided. When a car containing my improvement is running on a level, the mechanism in stopping the car stores up enough force when stopped to start the car forward when this force is released and made active.

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

1. In a car-starter mechanism, the combination of the beveled gear-wheel G^2, attached to the car-axle, the sleeve N, on and attached to the car-axle, the beveled gear-wheel G^3, constructed to turn on said sleeve, a ratcheted connection between the adjacent hubs of said gear-wheels G^2 and G^3, the ratchet-wheel I, constructed to receive motion from said gear-wheel G^3, and having its bearing on said sleeve, the coil-spring E, drum D^2, chain K, hook B^2, coupler gear-wheel G', the hand-wheel H, and vertical shaft V, with an intermediate mechanism to connect and disconnect said coupler gear-wheel and the gear-wheels G^2 and G^3, as and for the purposes set forth.

2. In a car-starter mechanism, the combination of the shaft V, the chain C^2, the rod R', angular turn-lever L, the lever l^2, the hinged plate p', the coupler gear-wheel G', the fork F, the beveled gear-wheels G^2 and G^3, and the ratchet-wheel I, with said parts constructed and arranged to operate substantially in the manner as and for the purposes set forth.

3. In a car-starter mechanism, the combination of the spring E, drum D^2, chain K, hook B^2, the beveled gear-wheels G^2 and G^3, the hinged plate p', the bar d', the fingers $w\,w$, the springs $k\,k$, and the hook-holders $m\,m$, arranged to operate substantially in the manner as and for the purposes set forth.

4. In a car-starter mechanism, the combination of the beveled gear-wheel G^2, constructed to move with the car-axle, the sleeve N, attached to said car-axle, the gear-wheel G^3, the ratchet-wheel I, with said ratchet-wheel and said gear-wheel G^3 constructed to turn on said

sleeve, and the said gear-wheel G^3 to communicate motion to said ratchet-wheel, the ratcheted groove g^4, in the hub end face of said gear-wheel G^3, and the detent-pins p^6, and springs s^6, in the hub end face of the gear-wheel G^2, as and for the purposes set forth.

5. In a car-starter mechanism, the combination of the gear-wheel G^2, attached to the car-axle, the sleeve N, attached to the car-axle, the gear-wheel G^3, and the ratchet-wheel I, arranged to run on said sleeve, a ratcheted connection between the adjacent hub end faces of said wheels G^2 and G^3, the friction-clutch plate D^4, the plate d^5, set-screws X, and the collar d^6, with said parts constructed and arranged to operate substantially in the manner as and for the purposes set forth.

6. In a car-starter mechanism, the combination of the hand-wheel H, vertical shaft V, and the chain C^2, connected with an intermediate mechanism to operate the coupler G′, the gear-wheels G^2 and G^3, the ratchet-wheel I, and chain K and spring E, as shown, and the chain C′ and rod R^2, connecting the shaft V with the brake B^6, as and for the purposes set forth.

Signed at Troy, New York, this 26th day of March, 1884, and in the presence of the two witnesses whose names were by them hereto written.

JOHN E. BROWN.

Witnesses:
GEO. F. HYDE,
CHARLES S. BRINTNALL.