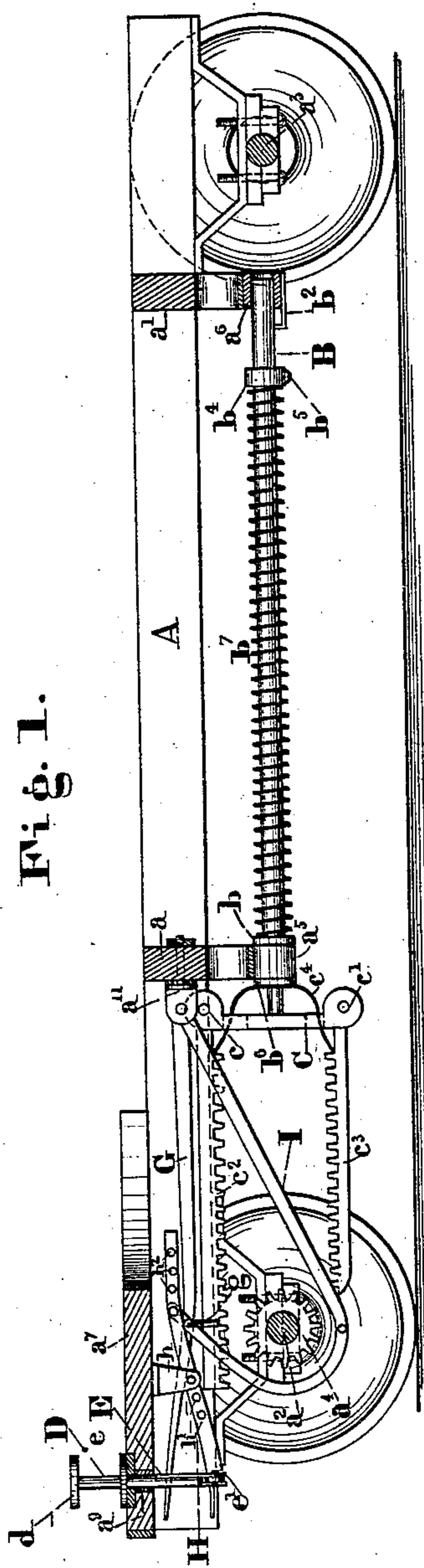
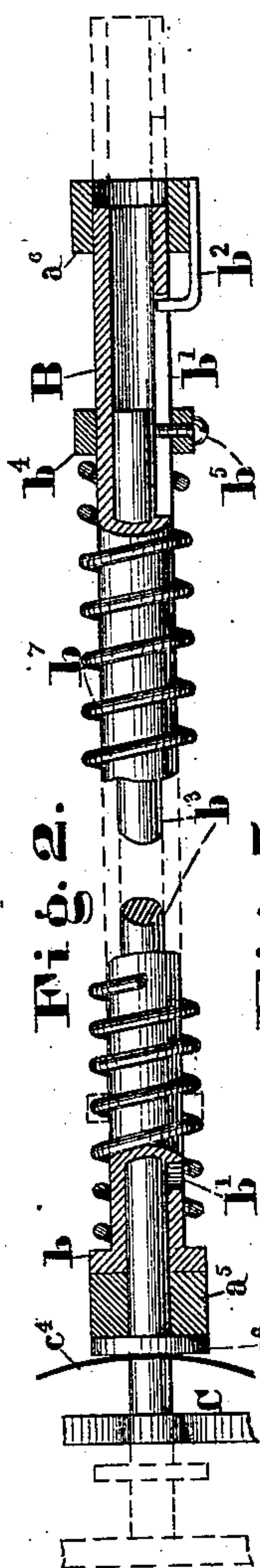


C. A. HOWE.
Car Brake and Starter.

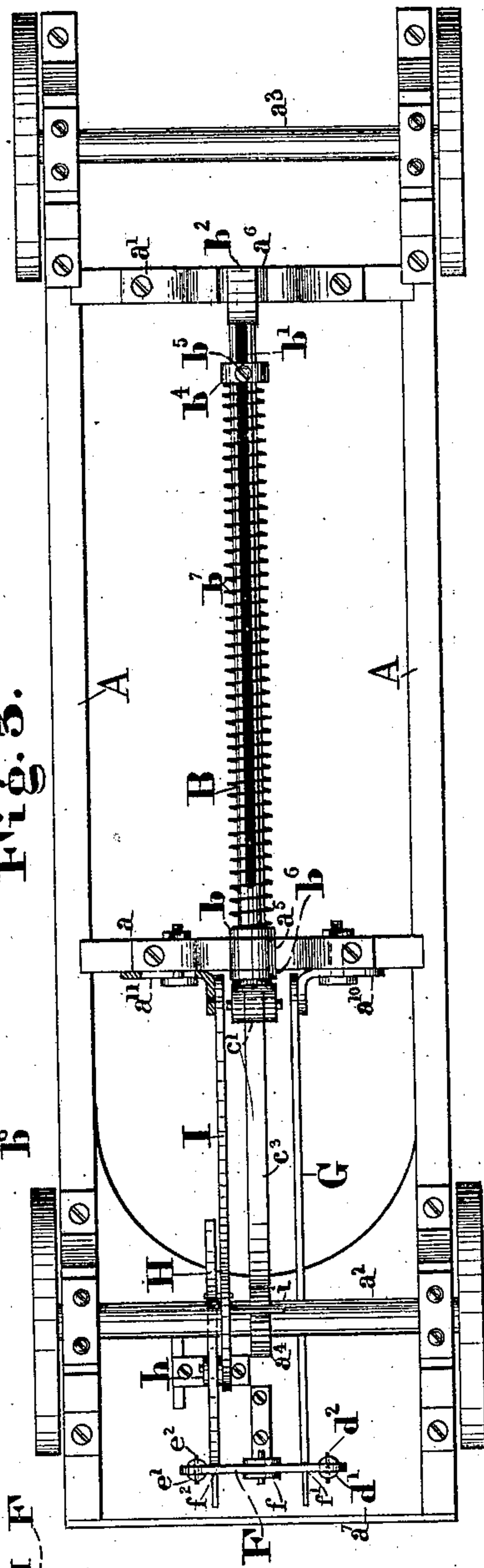
Patented May 4, 1880.



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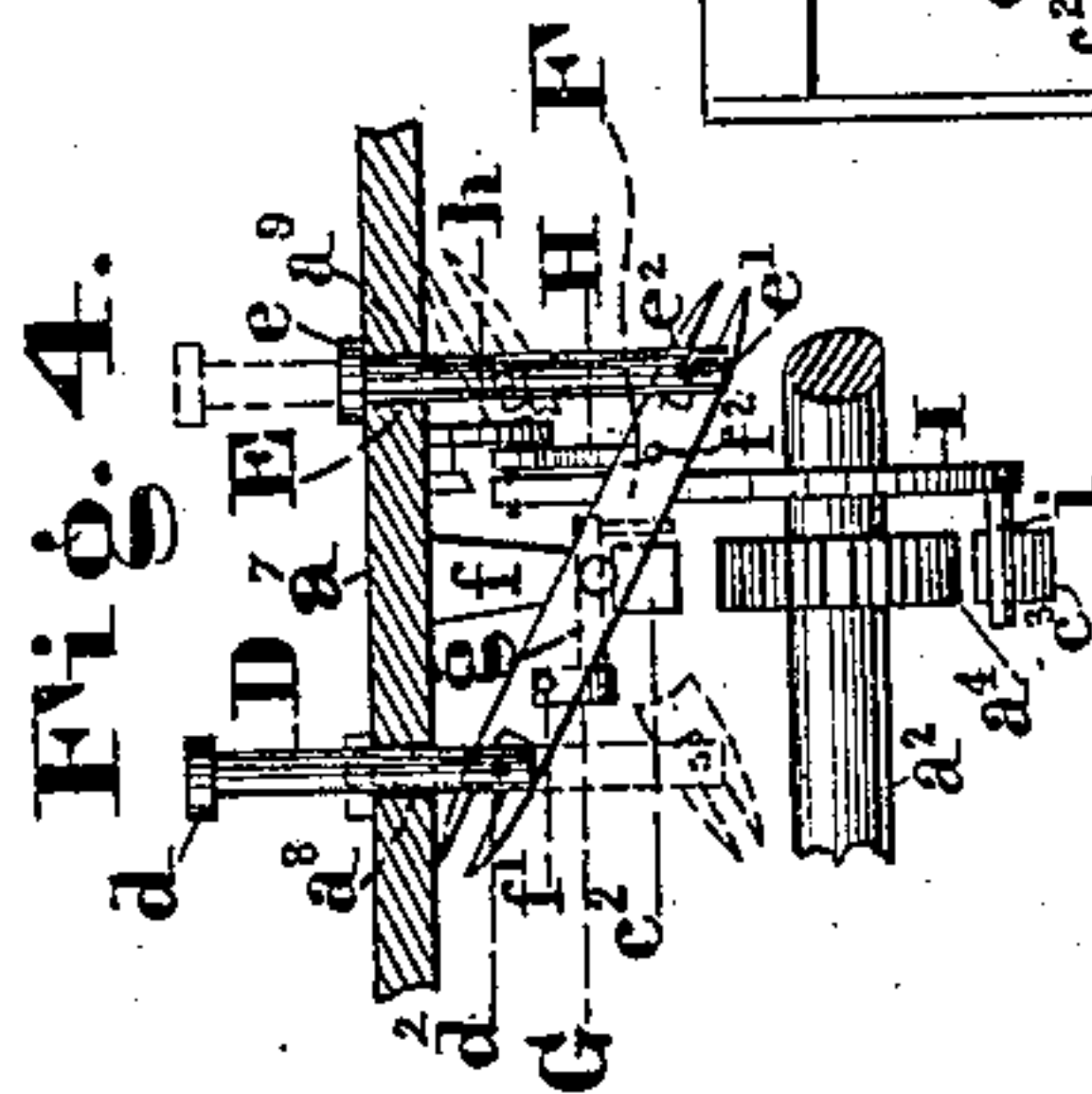


Fig. 4.

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UNITED STATES PATENT OFFICE.

CHARLES A. HOWE, OF NILES, MICHIGAN.

CAR BRAKE AND STARTER.

SPECIFICATION forming part of Letters Patent No. 227,255, dated May 4, 1880.

Application filed March 2, 1880. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. HOWE, of Niles, in the county of Berrien and State of Michigan, have invented certain new and useful Improvements in a Combined Car-Brake and Car-Starter; 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.

This invention, which is for use principally on street-cars, relates to that class of combined car-brake and car-starter in which the action of a pinion attached to the car-axle and two racks upon a spiral spring or its equivalent is made to stop the car and set it in motion again; and it consists, essentially, in arranging the racks and pinion in the same vertical plane, in connection with a system of rods and levers, throwing the racks into and out of engagement when requisite in the operation of the device.

The invention consists, further, in certain details, the construction and manner of operation of which are hereinafter more fully described.

In the accompanying drawings, Figure 1 represents a longitudinal section of the device; Fig. 2, a detail view of the longitudinal central bar and spiral spring; Fig. 3, a reversed plan of the invention, and Fig. 4 a detail view of the pedals and parts connected thereto.

In the drawings accompanying and forming part of this specification, A, Figs. 1 and 3, represents the car-frame, having the usual front and rear transverse beams, a and a' , and the front and rear axles, a^2 and a^3 , attached in the usual manner, the front axle, a^2 , being provided with the fixed central pinion, a^4 .

a^5 and a^6 are sleeves fixed centrally by brackets or other proper means to the under surfaces of the beams a and a' , respectively, and lying in the central longitudinal plane of the car-frame.

a^7 is a platform secured horizontally to the front end of the frame A, and provided near

its front edge with two openings, a^8 and a^9 , Figs. 1 and 4, on each side of its central longitudinal line, at equal distances therefrom.

a^{10} and a^{11} are brackets situated on the front surface of the beam a , at equal distances on each side of its center. These brackets are capable of adjustment longitudinally on said beam by means of slots and set-screws, as shown in Fig. 3.

B is a tube which extends from the sleeve a^5 to and partially into the sleeve a^6 . The tube B travels in the latter sleeve, and has the circular stop b fixed firmly to its front end.

b' , Figs. 2 and 3, is a slot in the bottom of the tube B, extending nearly the entire length of the same, and b^2 a stop secured to the sleeve a^6 . The end of the stop b^2 bends upward at right angles, and, entering the slot, bears against its rear end.

b^3 is a longitudinal spindle or rod, which travels within the tube B and sleeve a^5 , and b^4 is a ring which surrounds the tube, and is attached to the rear end of the rod b^3 by means of a set-screw, b^5 . b^6 is an encircling-flange on the rod b^3 near its front end and in front of the sleeve a^5 . b^7 is a spiral spring surrounding the tube B between the circular stop b and the ring b^4 .

It is evident from the foregoing that the said spiral spring may be compressed either by the forward motion of the rod b^3 or the rearward motion of the tube B.

C is a vertical bar having its center securely attached to the front end of the rod b^3 , and provided at its upper and lower ends with the hinge-joints c and c' , respectively. c^2 is a horizontal rack, united at its rear end to the bar C by the upper hinge-joint, c , and extending forward slightly above and slightly beyond the pinion a^4 . c^3 is a similar rack united to the bar C by the lower hinge-joint, c' . The latter rack is situated as far below the pinion as the rack c^2 is above the same, and its free end, which does not extend quite to the pinion, slopes upward and forward, as shown in Fig. 1.

c^4 is a curved double spring, the center of which passes over the front end of the rod b^3 and bears against the flange b^6 , while its up-

per and lower ends, after passing through slots properly situated in the bar C, bear respectively against the racks c^2 and c^3 to keep them at right angles to the said bar.

5 D and E, Figs. 1 and 4, are vertical shafts or rods passing respectively through the openings a^2 and a^3 in the platform a^7 , and provided on their upper ends with the foot rests or pedals d and e . These rods are deeply notched
10 at their lower ends, d' and e' , for a purpose hereinafter stated.

F is an oscillating bar, pivoted centrally to the lower end of a bracket or fulcrum, f , which is firmly fixed to the lower surface of the platform
15 a^7 on its central line. The ends of the bar F rest in the notches in the lower ends of the rods D and E, and are cleft or slotted longitudinally to accommodate the pins d^2 and e^2 by which the said rods are fastened to the
20 bar.

f' and f^2 are openings pierced in the bar F on each side of its center, at equal distances therefrom.

G is a lever, the rear end of which is pivoted to the bracket a^{10} , while its front end passes through the opening f' . This lever is provided at a proper point with an arm, g , projecting inwardly at right angles to the same and immediately above the front end of the
25 rack c^2 .

H is a similar lever with its front end passing through the opening f^2 and its rear end free. The lever H is pivoted near its central portion to a bracket, h , which is fixed at a proper
35 point on the lower surface of the platform a^7 .

I is a connecting rod or link, pivoted by its rear end to the bracket a^{11} , from which it runs forward and downward, and then, curving up around the axle a^2 , has its front end pivoted to the lever H in rear of the bracket
40 h . i is an arm projecting inwardly from the rod I at right angles to the same and extending below the rack c^3 , so that the latter may ride upon it and engage the pinion when the
45 rod I is raised.

The lever H is adjustable with reference to the rod I and bracket h by means of the two sets of holes h' and h^2 , Fig. 1, and a pin.

The operation of the invention is substantially as follows: Fig. 1 represents the car running with all the parts in their normal position, the pedal d being elevated and the pinion a^4 engaging neither of the racks.

When it is desired to stop the car, the pedal
55 D is pressed down and the oscillating bar F and the pedal E thrown into the position shown in dotted lines in Fig. 4. This motion lowers the rod G and causes the arm g to press the rack c^2 down. The latter thereupon
60 engages the pinion a^4 , the continued revolution of which draws the said rack and the rod b^3 forward and compresses the spiral spring b^7 until the resistance of the latter equals the
65 impelling force of the pinion. The same motion of the pedal d depresses, by means of the

rods I and H and bracket h , the projecting arm i , so that the rack c^3 can pass the latter in moving forward without engaging the pinion.

When it is desired to start the car again
70 the pedal e is pressed down, which motion lifts the upper rack out of engagement, and also, by raising the arm i , causes the lower rack to engage the pinion. The recoil of the spiral spring then acts by means of the rod b^3 ,
75 causing the said rack and pinion to rotate the axle a^2 .

The following are some of the advantages of the foregoing form of construction: first, the two racks lying in the same vertical plane,
80 it is not necessary that the pinion should have any sliding motion on the axle, therefore the former may be the more firmly secured to the latter, or, if desirable, both may be made in one piece; secondly, the arrangement of the
85 pedals and levers permits the racks to be easily controlled by the feet of the driver, leaving his arms free, and not requiring him to change his position when operating the device; and, thirdly, the combination of the tube
90 B with the rod b^3 makes it possible to attach the pinion and racks to either end of the car, or, if desired, to attach pinions and racks to both ends.

When the pinion and racks are put on the
95 rear end of the car the bar C and flange b^6 are fixed to an extension of the tube B behind the sleeve a^6 .

The flange b^6 is a stop, which bears against the sleeve adjacent to it and prevents the rod
100 b^3 from being drawn too far backward by the spiral spring. It also acts as a support for the center of the spring c^4 .

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

1. In a car-starting device, the combination, with the pinion a^4 , racks c^2 and c^3 , and proper actuating mechanism, of the rods D and E, oscillating bar F, levers H and G, and connecting-rod I, all constructed and arranged substantially as shown and described.

2. In a car-starting device, the combination of the spiral spring b^7 , slotted tube B, and rod b^3 with the sleeves a^5 and a^6 , ring b^4 , and stops
115 b , b^2 , and b^6 , all constructed and arranged as shown and described, for the purpose specified.

3. In a car-starting device, the combination, with the pinion a^4 , racks c^2 and c^3 , bar C, and spring c^4 , of the spiral spring b^7 , slotted tube
120 B, rod b^3 , and sleeves a^5 and a^6 , as shown and described, for the purposes specified.

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

CHARLES A. HOWE.

Witnesses:

THEODORE S. WEST,
V. L. WEST.