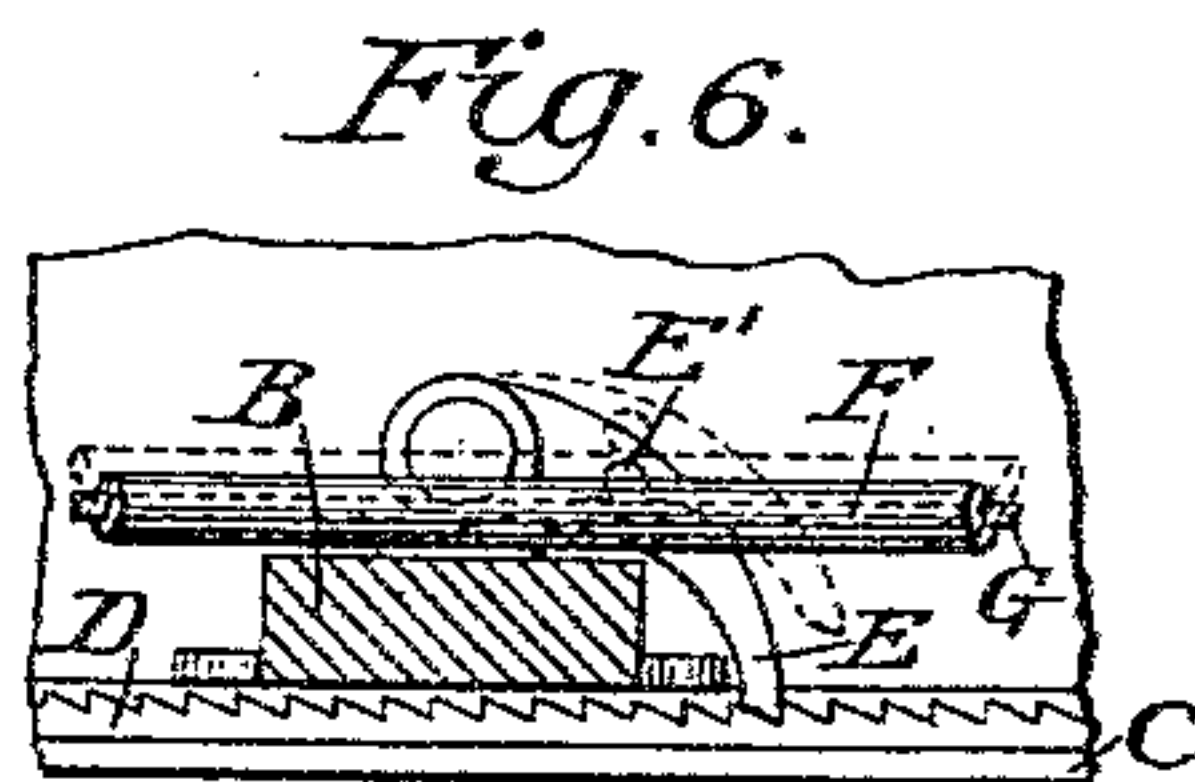
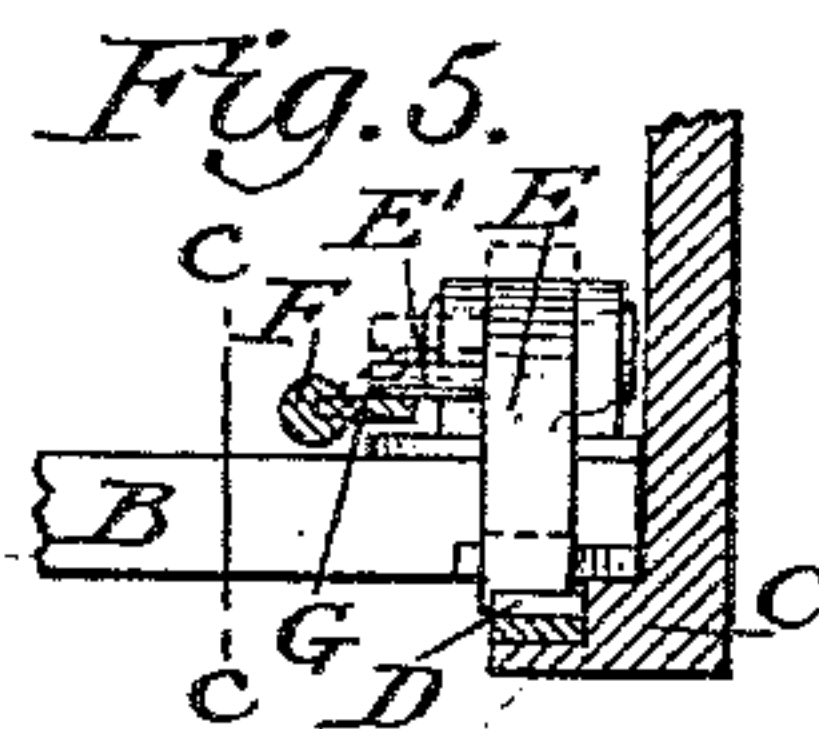
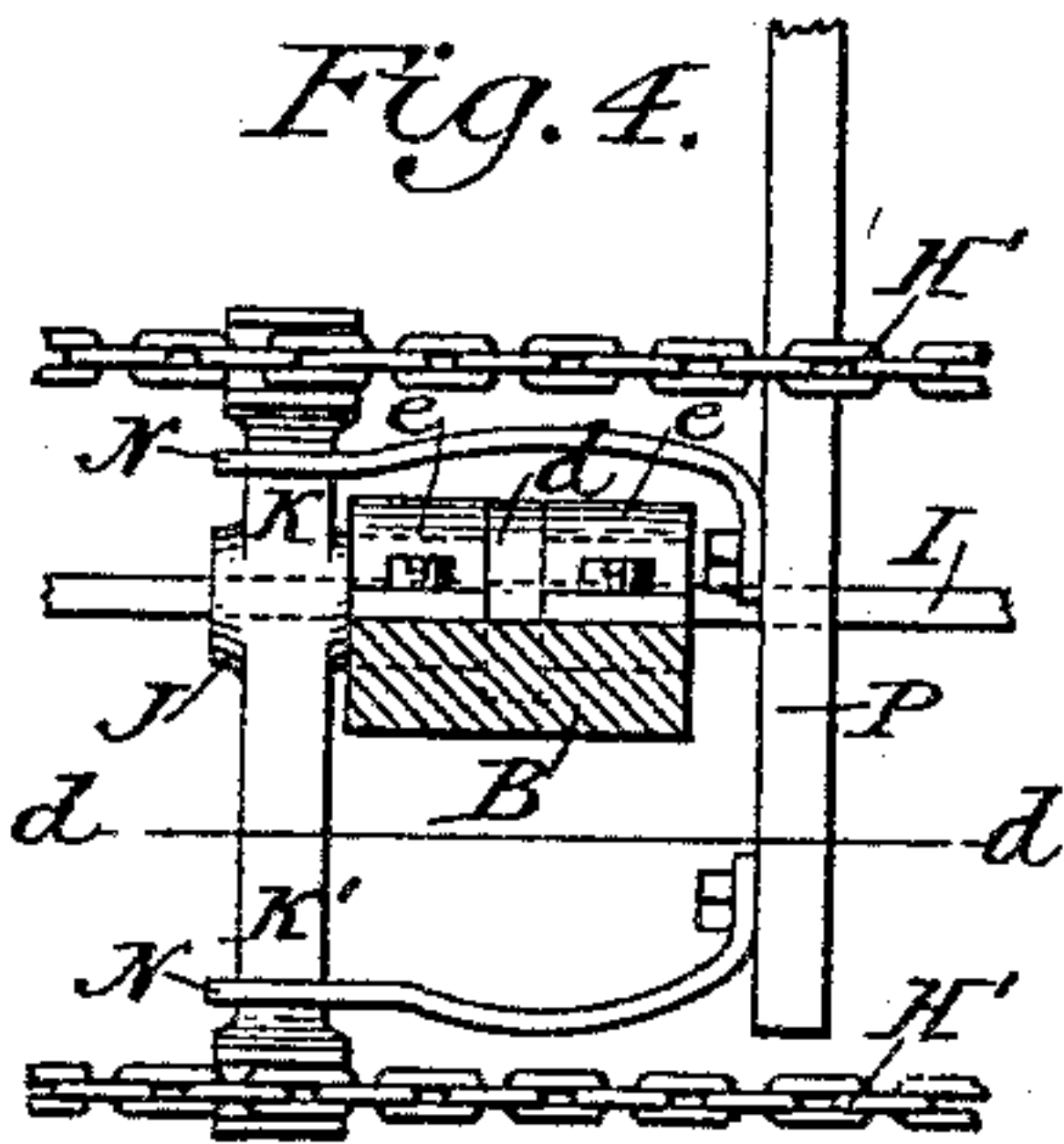
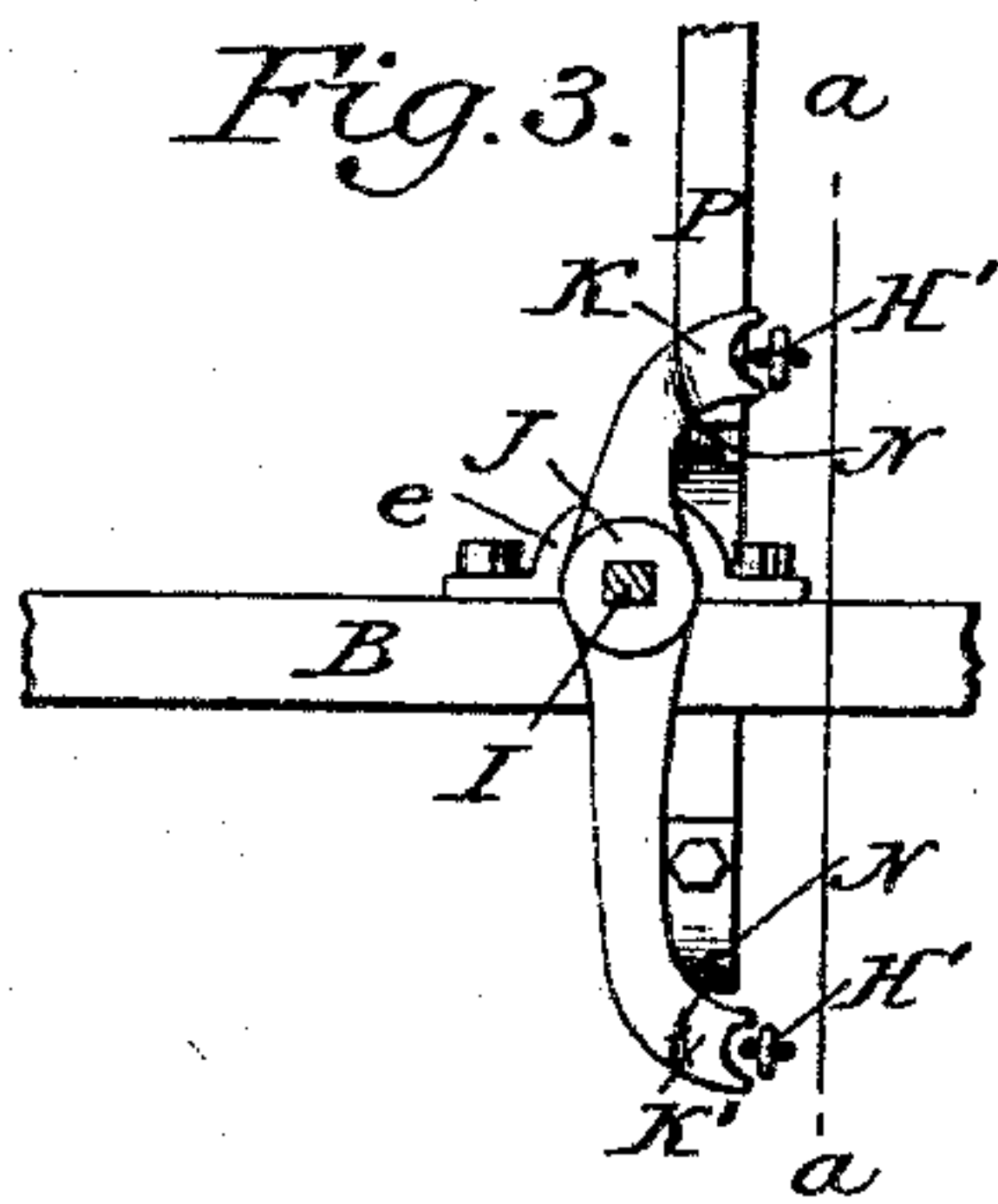
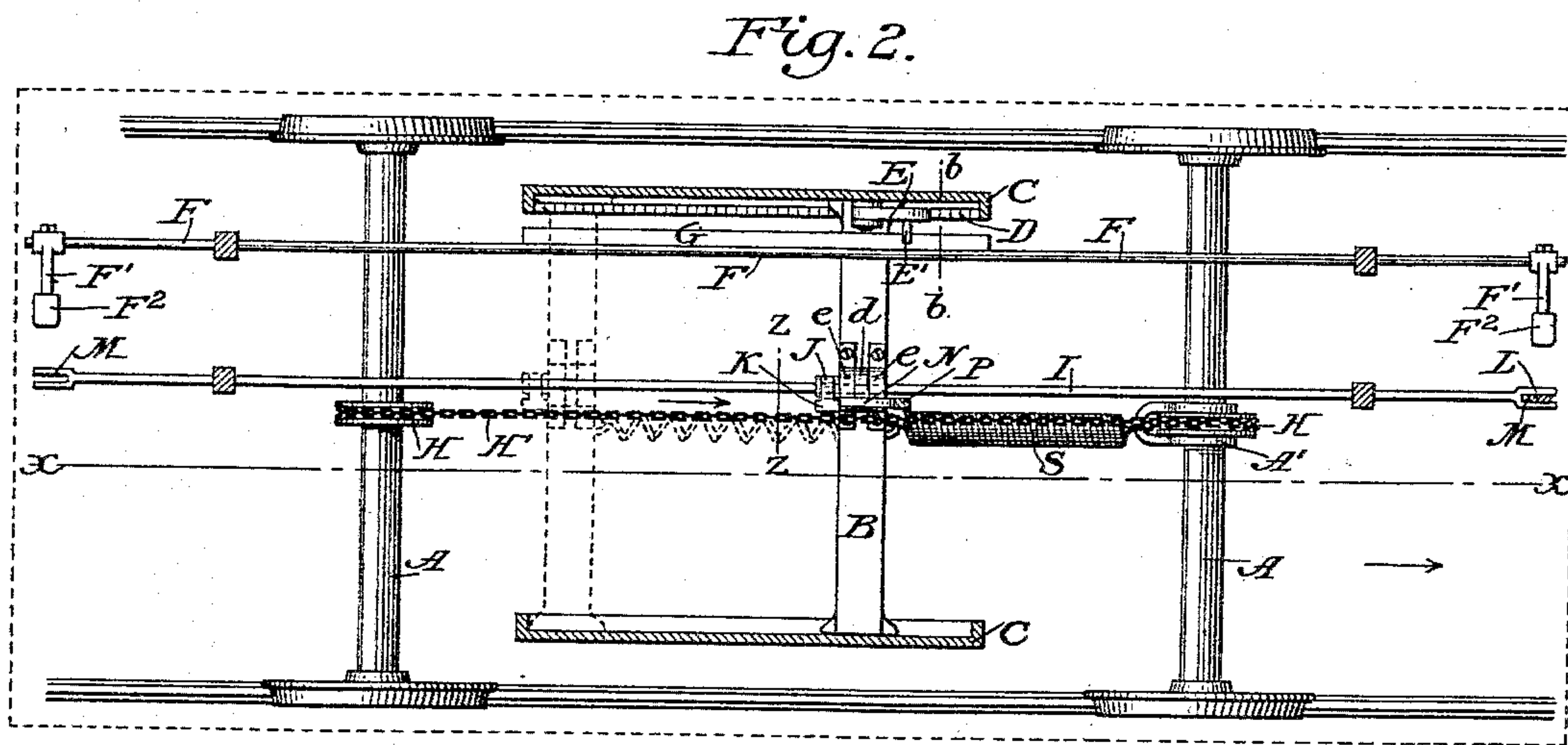
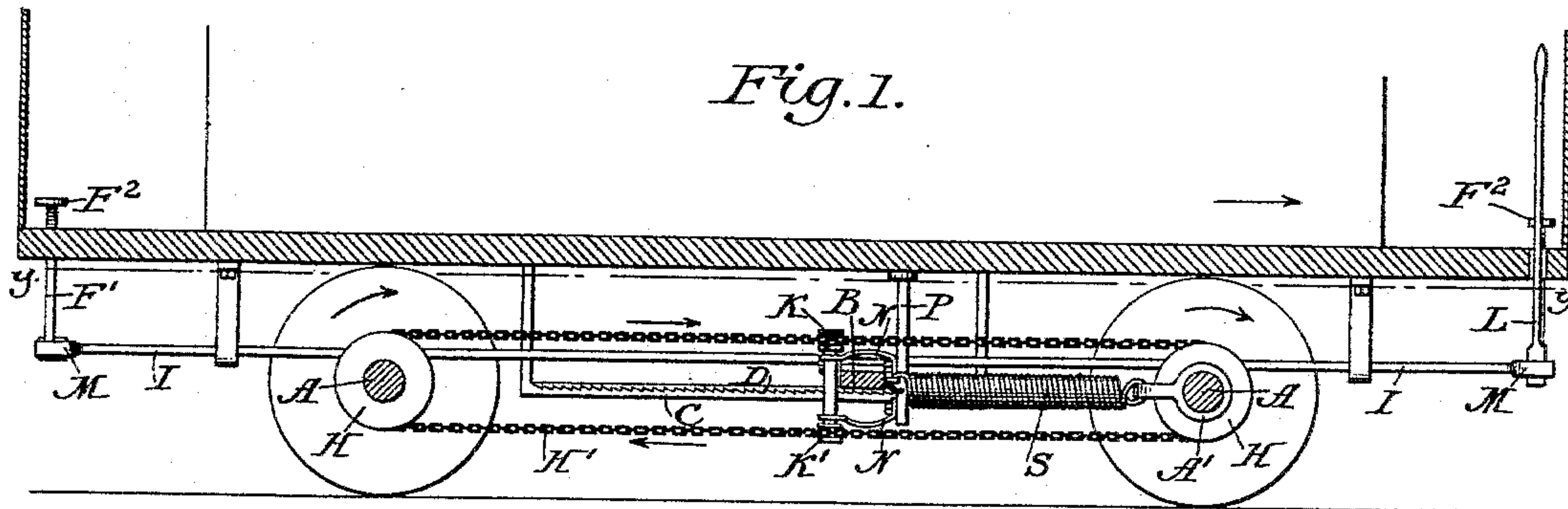


(No Model.)

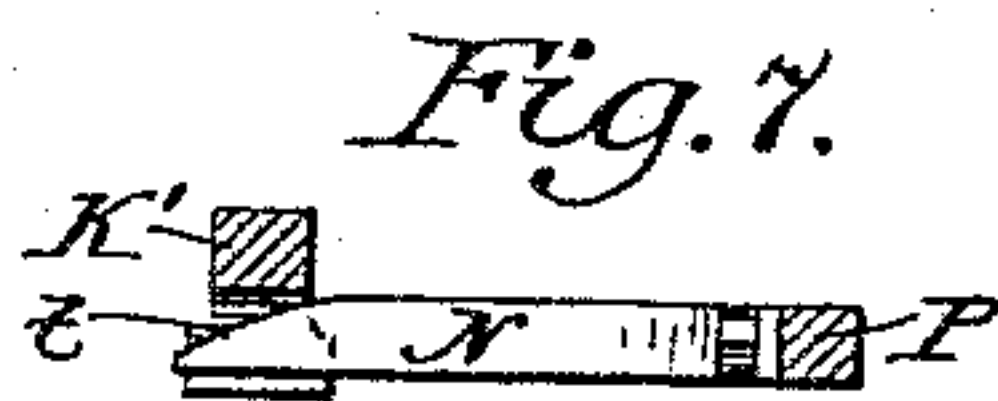
E. DEGERHOLM.  
CAR STARTER.

No. 412,022.

Patented Oct. 1, 1889.



Attest:  
H. H. Jespersen  
E. M. Watson



Inventor:  
Edward Degerholm  
By David A. Burr  
Atty.



# UNITED STATES PATENT OFFICE.

EDWARD DEGERHOLM, OF HELSINGFORS, FINLAND.

## CAR-STARTER.

SPECIFICATION forming part of Letters Patent No. 412,022, dated October 1, 1889.

Application filed February 12, 1889. Serial No. 299,578. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD DEGERHOLM, of Helsingfors, in the Grand Duchy of Finland, have invented certain new and useful  
5 Improvements in Car-Starters; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a  
10 part of this specification.

My invention relates to a street-car starter, in which the power of a long spiral spring is utilized in retarding and stopping the movement of the car and in thereafter starting it  
15 again; and has for its object to simplify the mechanism and reduce the same to the least number of parts while obtaining directly the most efficient application of the force which is stored in the spring by causing it to arrest  
20 the momentum of the car.

It consists in the novel combination and arrangement of mechanical devices, hereinafter fully described and claimed, for accomplishing the desired result.  
25 In the accompanying drawings, Figure 1 is a longitudinal vertical section of the lower portion of a street-car in line  $xx$  of Fig. 2, illustrating the application of my invention thereto; Fig. 2, a plan view thereof with the  
30 floor of the car removed; Fig. 3, a section in line  $zz$  of Fig. 2, illustrating in detail, upon an enlarged scale, the grip device; Fig. 4, a section in line  $aa$  of Fig. 3, and Fig. 7 a section in line  $dd$  of Fig. 4, severally illustrating the retraction device for the automatic detachment of the grip. Fig. 5 is a section in  
35 line  $bb$  of Fig. 2, and Fig. 6 a section in line  $cc$  of Fig. 5, severally illustrating the action of the pawl-releasing device.

40 Similar letters indicate like parts in all of the figures.

AA represent the axles of the cars, mounted and attached to the frame and body thereof in the usual manner, which need not herein  
45 be described. Intermediate the two axles, a bar B is mounted parallel with the axles to rest and freely slide at each end upon suitable horizontal ways CC, suspended from the frame of the car at a right angle with its  
50 axles. A spiral spring S is attached at one end to the middle of the bar B and at the

other to a yoke A', embracing loosely one of the axles A, as shown in Fig. 1, so that the stress of the spring will operate normally to draw the bar toward said axle. A longitudinal rack D is formed or secured just below  
55 the bearing-surface of one of said ways C, parallel therewith, and a pawl E is pivoted to the corresponding end of the movable cross-bar B, to drop into engagement with said rack,  
60 and thereby prevent automatically a reverse movement of said bar when it is carried forward against the stress of the spring S, in the direction indicated by the arrow in Figs. 1  
65 and 2 of the drawings.

A rod F is mounted parallel with the rack D at about the level of the pivotal axis of the pawl E, to extend from end to end of the car, and is left free to rock or oscillate in its bearings  
70 upon its longitudinal axis, its oscillation being effected by means of an arm F', projecting radially therefrom at each end thereof (see Fig. 2) and terminating in a pedal F<sup>2</sup>, which is preferably actuated by a spring, so  
75 that it shall return to its normal position after being depressed by the foot. This rod is fitted with a fin G, projecting therefrom opposite the rack D, along the entire length of  
80 said rack, in proximity to the pawl E, as shown in Fig. 2.

When the pawl E is in engagement with the rack and the rod F is in its normal position, the fin G lies immediately under a pin E', projecting laterally from the pawl, as  
85 shown in Fig. 5. When by a depression of the pedal F<sup>2</sup> the rod is oscillated, its fin in turning up will engage the pin E' and thereby lift the pawl out of engagement with the rack, as shown in dotted lines, Fig. 6. The engagement of the pawl is by means of the  
90 pedal thus brought under the control of the driver standing upon either platform of the car.

Sprocket-wheels H H are fixed upon the axles A A, preferably in line with the spring  
95 S, and an endless chain H' is carried over them, so that the chain is made to revolve with the axles, or the axles may be driven by the chain.

A second rod I is mounted parallel with the  
100 pawl-actuating-rod F, to extend the entire length of the car and in close proximity to



the endless chain H'. This rod is left free to oscillate upon its longitudinal axis, and is fitted with a sleeve J, which is made to engage it by means of a spline or by an angular cross-section, so as to partake of its oscillation, but is otherwise left free to move longitudinally thereon. The sleeve J is formed with a peripheral flange *d*, and is attached to the cross-bar B by means of straps *e e*, which embrace the sleeve on each side of said flange, so as to permit of its oscillation and yet prevent its longitudinal movement on the rod I independently of the bar. From this sleeve J, thus made to oscillate with the rod I, but left free to move longitudinally thereon and to carry the bar B with it in said longitudinal movement, gripping-arms K K', having forked ends, are made to project in opposite directions, so as to permit of an engagement by said ends alternatively of the upper or the lower length of the endless chain H', according as by the oscillation of the rod I the one arm or the other is swung toward the chain.

When the lower length of the chain is moving from the spring S, as occurs when the car is moving in the opposite direction, as indicated by the arrow in Figs. 1 and 2, if the lower grip-arm K be swung into engagement therewith the arm and with it the bar B will be carried in the same direction, thereby extending the spring so as to bring its resilient power into play to retard and finally arrest the movement of the chain and consequently of the car. As the bar B is thus carried with the chain, its reverse movement is prevented by the action of the pawl E. If, now, said lower grip-arm K be released from the chain and the upper grip-arm K' be swung into engagement therewith and the pawl E lifted and released from the rack D, the power of the spring will be exerted to start and move the chain again in the same direction and thereby start the car forward in the direction in which it was moving when arrested by the engagement of the lower arm with the chain, in manner as described. When the car is moving in the opposite direction, so as to reverse the direction in which the chain moves, the spring will be extended and the chain arrested by an engagement of the upper grip-arm with the chain, and when the spring is fully extended thereby the release of the upper and the engagement of the lower grip-arm with the chain will, so soon as the pawl E is released, bring the power of the spring into play to start and move the car in said direction. The one spring S, actuating the one bar B, in connection with the one pawl E', is thus made available to stop and start the car in whichever direction it may be moving.

The oscillation of the rod I to swing the upper and lower grip-arms into engagement with the chain as occasion may require, is effected from either end of the car by means of a detachable lever L, whose lower end admits of insertion between the arms of a fork or into a slot M in either end of the rod.

When by the retraction of the extended spring S the cross-bar B and with it the grip-arms K K' are brought to the normal position of rest, the grip-arms are automatically brought to a vertical position and thereby released from engagement with the chain H', so as to allow it to move freely independently thereof by means of fingers N N, (see Fig. 4,) projecting parallel with the rod I from a hanger P, each in position to engage one of said grip-arms if it be in engagement with the chain, and by means of an inclined or beveled surface *t* on the end of the finger (see Fig. 7) force the arm back from the chain.

In the operation of the device, if the car be moving to the right, so that its wheels shall revolve in the direction indicated by the arrows thereon in Fig. 1, when the driver desires to stop the car he will swing the lever L to the left and thereby throw the lower grip-arm K' into engagement with the lower length of the chain H', so that the movement of the chain will operate to extend the spring S and arrest the chain and thereby stop the wheels. A reverse movement of the chain under the stress of the spring will be prevented by the engagement of the pawl E with its rack. When the driver desires to start the car again, he will swing the lever L back to the right and thereby disengage the lower grip-arm K' and cause the upper grip-arm K to engage the chain, and will, by pressing down the pedal F, cause the rod F to oscillate and thereby swing the fin G on said rod upward far enough to cause it to lift the pawl E out of the rack, so as to leave the bar B free to move back and bring the stress of the spring into play to draw back the grip-arm K' and with it the chain, and thereby cause the wheels to revolve in the direction to move the car forward.

I claim as my invention—

1. The combination, with the axles of a car and with an endless chain geared thereto to revolve therewith, of a bar moving transversely to the chain between the two lengths thereof, gripping-arms pivoted to said bar to swing alternatively into engagement with the chain, a spring interposed between the bar and one of the axles to draw the bar toward the axle, a pawl carried with the bar to engage a rack and thereby prevent the retraction of the bar by the spring, and means, substantially as described, for releasing the pawl and for oscillating the grip-arms, substantially in the manner and for the purpose herein set forth.

2. The combination, with the axles of a car, of an endless chain geared thereto, a bar moving transversely between the two lengths of the chain, a spring actuating the bar in one direction, and gripping-arms pivoted to the bar to engage alternatively the upper and lower lengths of the chain to move the bar in the opposite direction, and stationary fingers placed to engage and detach either arm from the chain when the bar is drawn fully back by the spring, substantially in the manner and for the purpose herein set forth.



3. The combination, with the axles of a car, of an endless chain geared thereto, a bar moving transversely between the two lengths of the chain, an oscillating rod extending parallel with the chain from end to end of the car, a collar sliding longitudinally upon said rod, but made to oscillate therewith and attached to the bar to partake of its movement, gripping-arms extending from said collar to engage alternately in its oscillation one of the lengths of the chain, and means, substantially as described, for producing an oscillation of said rod at either end of the car, substantially in the manner and for the purpose herein set forth.

4. The combination, with the axles of a car, of an endless chain geared thereto, a bar moving upon suitable ways transversely between the two lengths of the chain, a spring actuating the bar in one direction, gripping-arms pivoted to the bar to engage alternatively the

upper and lower lengths of the chain to move the bar in the opposite direction, a pawl carried with the bar and having a lateral stud or pin, a fixed rack engaged by the pawl to prevent a movement of the bar under the stress of the spring, an oscillating rod extending the length of the car adjacent to the pawl, having a lateral fin projecting therefrom under the lateral pawl-pin, and means, substantially as described, for oscillating said rod and thereby causing the fin to lift the pawl and disengage it from its rack, substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD DEGERHOLM.

Witnesses:

A. N. JESBERA,

E. M. WATSON.