(No Model.)

C. A. SULZMAN.

CAR STARTER.

No. 263,363. Patented Aug. 29, 1882.

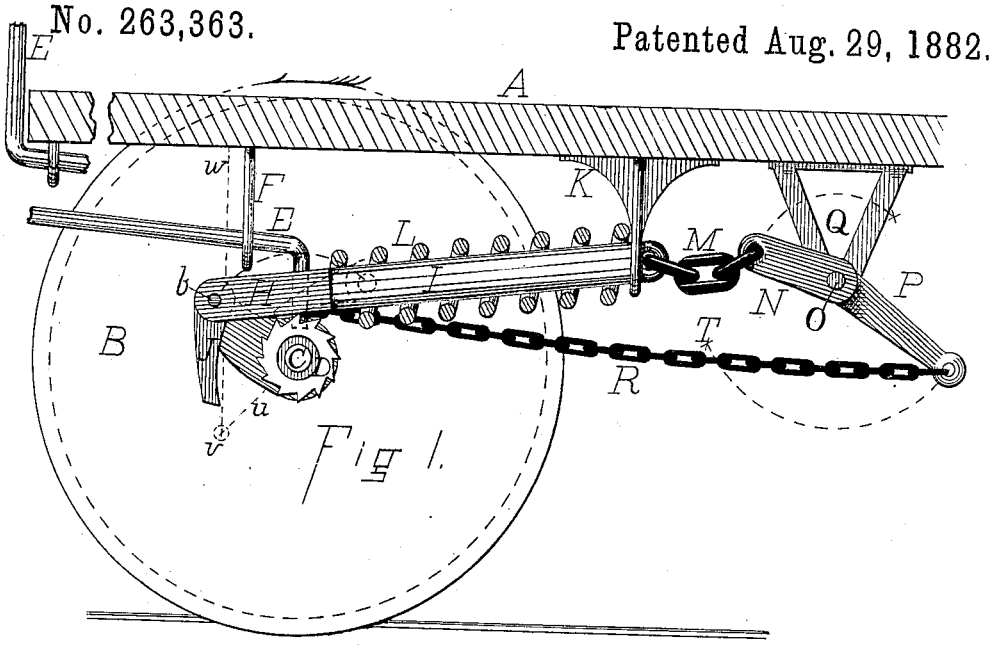

Fig 1.

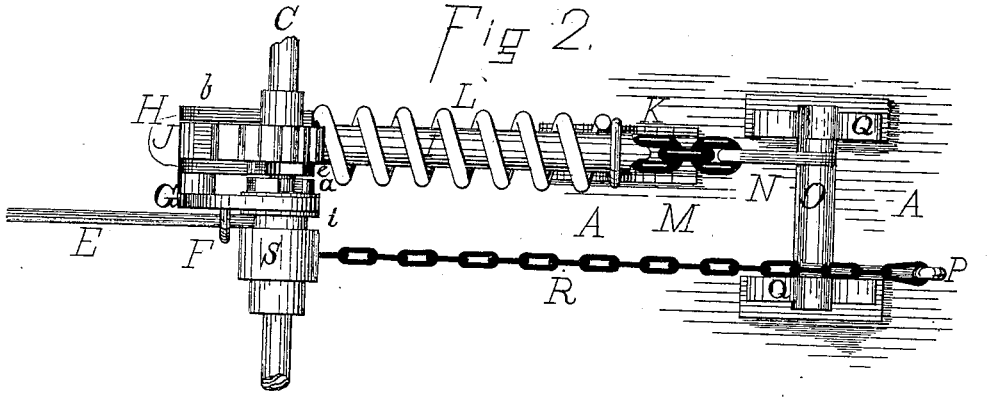

Fig 2.

WITNESSES.

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CHARLES A. SULZMAN, OF WATERFORD, NEW YORK.

CAR-STARTER.

SPECIFICATION forming part of Letters Patent No. 263,363, dated August 29, 1882.

Application filed July 12, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. SULZMAN, a citizen of the United States, residing at Waterford, in the county of Saratoga and State of New York, 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 car-starters in which the momentum of the car is accumulated in the act of stopping, and is afterward used as force to assist in starting to move the car in its original direction; and the objects of my invention are, first, to provide a simple and effective device for storing up the force of the advancing car by the act of stopping it, and then applying this force in the right direction to start the car forward; and, second, to provide a simple device for preserving a fixed relation of the engaging-pawl to its ratchet-wheel secured to the axle, the pawl communicating with the car, whose relation to said axle is constantly varying. I attain these objects by means of mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation, part in section; and Fig. 2 is an inverted plan, showing part of a car with my invention attached.

A represents the body of a car; B, a wheel, and C the axle.

a is a clutch, of the usual construction, hung on the axle C, so that the axle may revolve freely within it. It slides endwise on the axle enough to engage the clutch *e*, which is fixed firmly upon the axle, and, as a matter of economy, is a portion of the same casting as the ratchet-wheel D, which revolves continually with the axle.

E is a hand lever or shifter, by means of which the car-driver engages or disengages the two clutches by swinging the lever to the right or left. One end of this lever rides in a groove, *i*, of the clutch *a*, while its body is free to rise and fall in its rear stay, F, to accommodate the motion of the car. This shifter and the car-body A are shown as broken and shortened to bring the car end within the limit of the drawings, Fig. 1.

G is an arm swinging upon and concentric with the clutch *a*, kept in place endwise by means of collars on the clutch. This arm G is provided with a stud-pin, *b*, at its outer end, on which hangs a pawl, J, which engages the ratchet-wheel D.

H H are two extensions of the bar I, which are also hung upon the stud *b*, to swing with it upon the clutch *a*. The bar I carries a strong spring, L, one end of which operates against the shoulder of the bar I, formed by the extensions H, and the other end is resisted by a bracket, K, depending from the car and supporting the rear end of the bar I.

M is a chain connecting the bar I with the arm N, which is attached to the rock-shaft O, which carries at its other end the arm P, and is journaled in brackets Q, secured to the car.

R is a chain connecting the arm P with the drum S of the clutch *a*, upon which it is wound when the clutch is thrown into engagement with the mate clutch *e*, drawing the arm P forward toward the point T, thus drawing backward the arm N, chain M, bar I, and pawl J, engaging said pawl with the ratchet D, as shown in dotted lines, and compressing the spring L.

When the clutch is disengaged the spring L is set free and presses the bar I, pawl J, and ratchet-wheel D forward, thus propelling the car-wheel B a short distance on its track corresponding to an arc of the wheel B equal to the angle which the arm G was drawn back when the car was stopped. The ratio of the parts is a question to be decided by experiment. The force of the spring L should be four or five times that required to draw the car when once started. I think that to move the wheel one-quarter of a circle by the starter will be sufficient in practice. I have therefore proportioned the lever N and arm G to accumulate sufficient force in the spring to stop the car by one-quarter of a circle of motion after the clutch is connected; but the size of the drum S is such that a complete revolution is necessary to wind up the chain R enough to operate the levers P and N to draw back the arm G one-quarter of a circle. Thus the momentum of a whole revolution of the wheel while the car is running is stored up to be expended on one-quarter of a revolution in starting. The common brake will be used in con-

nection with the starter to check the speed of the car before the starter is connected, so that the car will not be stopped too suddenly by the starter. The ratio of the drum S, levers P N, and arm G may be such as to accumulate the full force of the spring in running any desired distance, and such as to expend said force in starting the car any reasonable amount. The arm G, being hung concentric with the ratchet C, maintains the pivot of pawl J in the same relation thereto at all points of its arc of motion. The arm G is intentionally arranged to traverse an arc, which leaves the pawl J to hang free of the ratchet, as shown, to prevent a clattering noise when the car is in motion. The clutches *a e* may be of any style that can be used, as described. The spiral spring L may be substituted by any other device which will store up power in the manner described, such as a leaf-spring, a compressing air-chamber, a weight to be raised, &c. In the latter case the car itself may be the weight. This, I think, is as practicable, and it may be cheaper, than the spring shown.

To adapt my invention to raise the car, instead of compressing a spring in order to use the weight of the car as a self-starter, it would only be necessary to remove the spring L, extend an arm at *u* from arm G to *v*, and there connect with a pitman located at *w* to press against the car-bottom. The operation and result would be the same as that described for the use of the spring. The car would require longer brackets between which the axle-box rises and falls by about six or eight inches. This is not offered as the best way of adapting my invention to use the weight of the car for the purpose stated, but it illustrates a modification of the device shown.

In cars which run either end first a starter would be required on each axle, because my device is only adapted to operate one way.

The device may be applied in front of the axle by allowing the chain R to wind under the drum S, and a chain might be used to connect the arm G, as now located, with the new arm P, doing away with the arm N and using an extension-spring instead of the compression-spring L to draw the pawl J forward.

What I claim as my invention is—

1. The combination, with the clutches *a e* and shifting-lever E, of a pawl, J, arranged to engage a ratchet-wheel, D, secured to the axle, the pushing-bar I, carrying the pawl J at one end, connected to the lever N at the other end, the levers N P of the rock-shaft O, the chain R, arranged to wind upon the drum S of the clutch *a* at one end, and connected with the lever P at the other end, and a spring, L, as shown and described.

2. The combination, with the ratchet-wheel D and clutch *e*, secured to the axle, and the clutch *a*, free on the axle, of an arm, G, hung upon the clutch *a*, carrying a stud-pin, *b*, on which the pawl J and the pushing-bar H I hang, as shown and described.

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

CHARLES A. SULZMAN.

Witnesses:
GORDON DAVIS,
CHARLES F. VAMLECK.