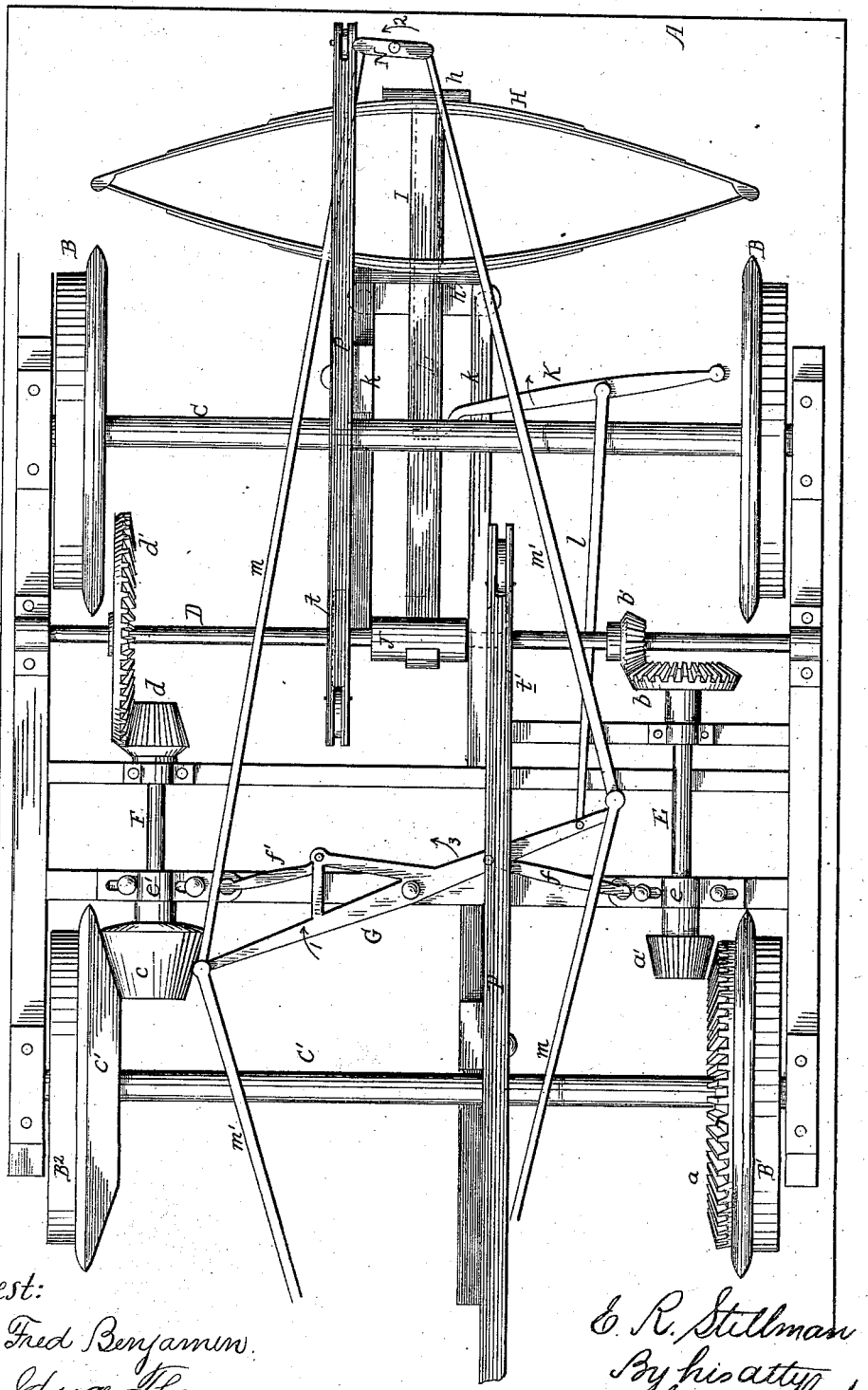
2 Sheets—Sheet 1.

E. R. STILLMAN.

CAR-STARTER.

No. 187,781. Patented Feb. 27, 1877.

Fig. 1.



Attest:

Fred Benjamin.

George Thorn.

E. R. Stillman

By his atty

Charles E Foster

2 Sheets—Sheet 2.

E. R. STILLMAN.

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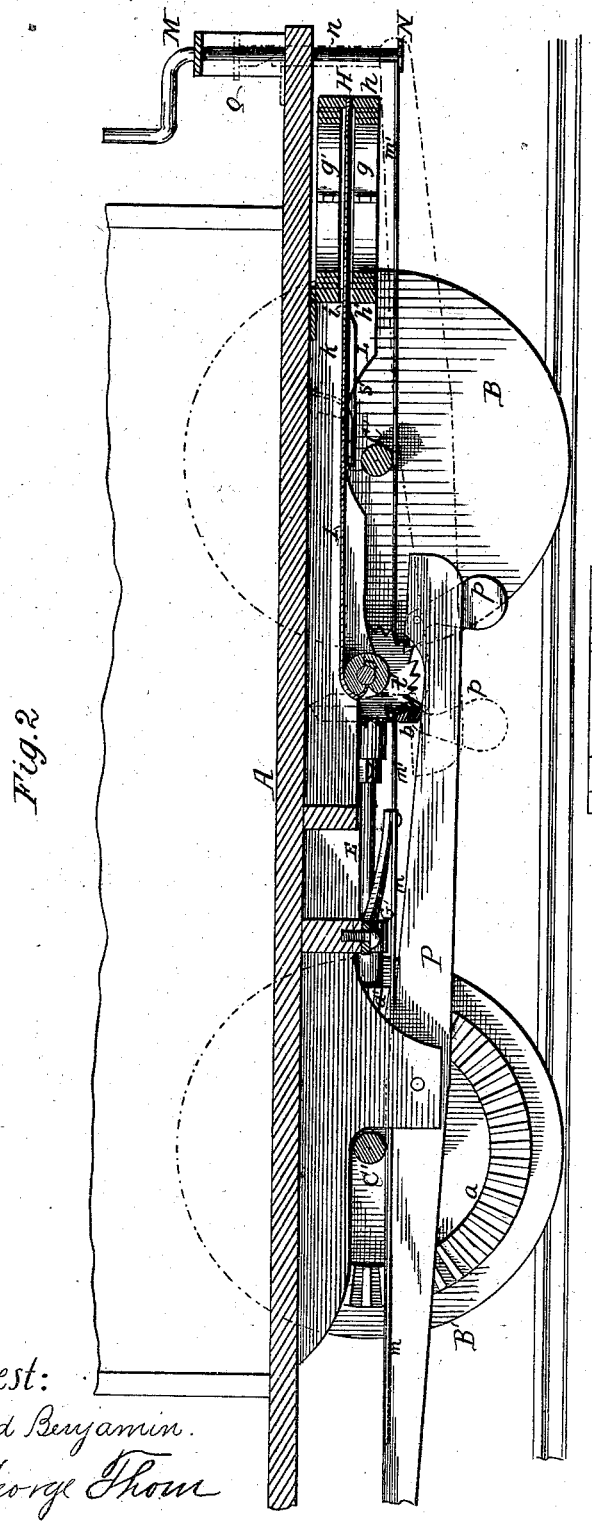

Fig. 2

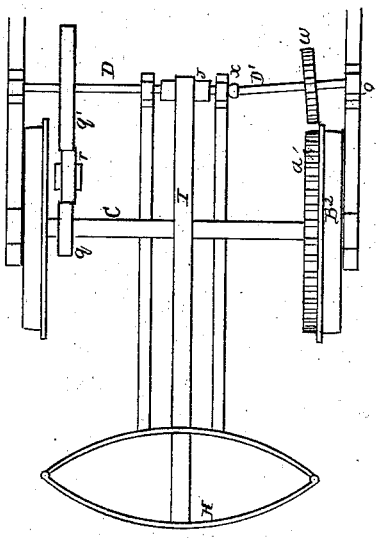

Fig. 3

Attest:
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By his atty
Charles E. Foster

UNITED STATES PATENT OFFICE.

ELLICOTT R. STILLMAN, OF BURR OAK, MICHIGAN.

IMPROVEMENT IN CAR-STARTERS.

Specification forming part of Letters Patent No. **187,781**, dated February 27, 1877; application filed November 2, 1876.

To all whom it may concern:

Be it known that I, ELLICOTT R. STILLMAN, of Burr Oak, St. Joseph county, Michigan, have invented Improvements in Car-Starters, of which the following is a specification:

The object of my invention is to effectively and economically store up the power used in arresting the movement of a car and utilize it for starting the same; and this object I accomplish by means of the devices shown in the accompanying drawings, in which—

Figure 1 is an inverted plan view of a car with my improved starting device applied thereto; Fig. 2, a longitudinal section, and Fig. 3 a modification.

The body A of the car is mounted upon wheels B B^1 B^2, secured to axles C C′, and applied in the usual manner. Beneath the car-frame are the bearings of three shafts, D E F, the shaft D being parallel to the axles, and the shafts E F at right angles thereto. A spur-wheel, *a*, on the inside of one of the wheels B^1, is adapted to a bevel-pinion, *a′*, on the end of the shaft E, a spur-wheel, *b*, on the opposite end of said shaft gearing with a bevel-pinion, *b′*, on the shaft D. On the outer end of the shaft F is a conical friction-wheel, *c*, adapted to the inclined annular face *c′* of one of the car-wheels, B^2, and a bevel-pinion, *d*, at the opposite end of this shaft gears with a spur-wheel, *d′*, on the shaft D. The bearings *e e′* for the outer ends of the shafts E F are capable of lateral adjustment, so that the pinion *a′* may be moved into and out of gear with the spur-wheel *a*, and the wheel *c* to and from the inclined face *c′*, these movements being effected by means of a lever, G, hung beneath the car, and connected by links *f f′* to the sliding bearings *e e′*. These links are so arranged that when the lever is moved in direction of the arrow 1, Fig. 1, the pinion will be brought into gear with the spur-wheel, while the conical roller *c* will be withdrawn from the face *c′*, and vice versa. Beneath one end of the car is suspended a spring, H, consisting, in the present instance, of two elliptic springs, *g g′*, placed one above the other, with an intervening space, and secured at opposite sides to plates *h h′*, the latter being fastened to the ends of parallel braces *k k* beneath the car. A band, chain, or strap, I, connected between the springs *g g′* to the plate *h*, passes through an opening, *i*, in the plate *h′*, and is connected to a drum, J, on the shaft D, and beneath said strap, from the plate *h*, extends a bar, L, which terminates at a point adjacent to the axle C, and has a slot, *s*, for the reception of the end of a lever, K, pivoted at the opposite end to the frame of the car. A rod, *l*, connects the lever K with the lever G. Through the platform of the car, near each end, passes a rod, M, having a crank-handle at the top, and a cross-bar, N, at the bottom, and to the opposite ends of said cross-bar are jointed the ends of rods *m m′*, connected to the opposite ends of the lever G. To hangers extending from the car-body are pivoted two levers, P P, the outer end of each extending beneath one platform of the car, and being pivoted to a vertical rod, *n*, extending through the platform, and having a foot-plate, Q, at the upper end. Each lever P carries at its inner end a weighted pawl, *p*, the ends of which are adapted to the teeth of ratchet-wheels *t t′* on the shaft D, the teeth of the two ratchet-wheels being inclined in opposite directions, for a purpose described hereafter. Under ordinary circumstances the spring H will be expanded to its full extent, and the various parts above described are so arranged that the pinion *a′* will be out of gear, and the roller *c* will be free from contact with the face *c′*. When the motion of the car is to be arrested the driver, standing upon either platform, will turn the adjacent shaft M in the direction of the arrow 2, Fig. 1, thereby swinging the lever G in the direction of the arrow 3, and bringing the roller *c* into frictional contact with the face *c′* of the car-wheel B^2, which therefore imparts a rotary motion to the roller and its shaft, and to the driving-shaft D.

As the shaft D revolves, the belt I will be wound upon the drum J until the spring H is compressed to its full extent, when, if the motion of the car is further continued, the face *c′* will slip past the roller *c*, thereby preventing the undue straining or breaking of any of the parts. Under ordinary circumstances,

however, the power required to compress the spring will be sufficient to arrest the movement of the car.

It will be seen that this result will be effected whichever may be the direction of the movement of the car, as the flexible strap *i* will be wound upon the drum J, revolving in either direction. The reverse movement of the shaft is prevented by the pawl *p* of the lever P, which is under the control of the conductor. Thus, when the car is moving in the direction of the arrow, Fig. 2, the pawl of the lever (shown in dotted lines) will retain the shaft D immovable. When the car is to be started the conductor or driver turns the adjacent shaft M, so as to throw the pinion *a'* into gear with the spur-wheel *a*. He then places his foot upon the plate Q, presses down the bar *n* and lever P, and thus disengages the pawl from the ratchet-wheel, when the spring, by its recoil, will unwind the strap from the drum, rotate the shafts D E, the pinion *a'*, and impart a rotary motion to the car-wheel B^1, thereby starting the car. As the spring reaches the extent of its outward movement, the end of the slot in the bar L will strike the end of the lever K, and the latter will be carried in the direction of its arrow to such an extent as to remove the pinion *a'* and roller *c* from contact with the wheels of the car.

It will be seen that the devices above described are of a character to be readily applied to any of the cars in use without any alteration in the structure of the latter, the spur-wheel *a* being bolted to one wheel, and a ring, having a beveled face, *c'*, to the other.

It will further be seen that all straining and breaking of the parts is effectually prevented, that no duplicate or alternate parts are required in order to impart motion in either direction from the spring, and that a spring of great power may be obtained by means of two elliptic springs connected, as set forth.

It is not absolutely necessary to employ the precise arrangement above described. For instance, the shaft D may consist of two sections, connected by a universal joint, *x*, the end of the section D' turning in a sliding bearing, *o*, as shown in Fig. 3.

Motion is imparted to the shaft D from the axle by means of a movable friction-pulley, *r*, which may be interposed or withdrawn from contact with friction-wheels *q q'*, carried by the axle and shaft, and a pinion, *w*, may be thrown into gear with the spur-wheel *a* of the wheel B^2 by adjusting the bearing *o*.

Any suitable devices may be employed for adjusting the pulley *r* and bearing *o*, the result being the same as in the first instances.

Without, therefore, confining myself to the precise arrangement shown,

I claim—

1. The shaft D, driven by friction devices from one car-wheel, and provided with adjustable gears for connecting it with another, in combination with the spring H and band I, connected to the spring, and to a drum on the said shaft, all substantially as and for the purpose specified.

2. The spring H and driving-shaft D, and flexible band or strap I, connected to the shaft and spring, all combined and operating as set forth.

3. The combination of the axle, the driving-shaft D, parallel to the axle, shafts E F, carrying friction and bevel pinions, movable bearings *e e'*, supporting the inner end of said shafts, and lever G, arranged between and connected by links to both bearings, substantially as specified.

4. The lever G, connected to shafts M at both ends of the car, and to the movable bearings of the friction and gear wheels, substantially as set forth.

5. The combination of the spring H, slotted bar L, and lever K, connected to the lever G, substantially as and for the purpose set forth.

6. The combination of the shaft D, its ratchet-wheels *t t'*, levers P P, and bars *n n'*, as specified.

7. The combination of the two elliptic springs *g g'* and plates *h h'*, as specified.

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

ELLICOTT R. STILLMAN.

Witnesses:

OLIVER NICHOLS,

D. F. PARSONS.