

L. D. BENNER.

Car-Starters.

No. 134,840.

Patented Jan. 14, 1873.

Fig. 1.

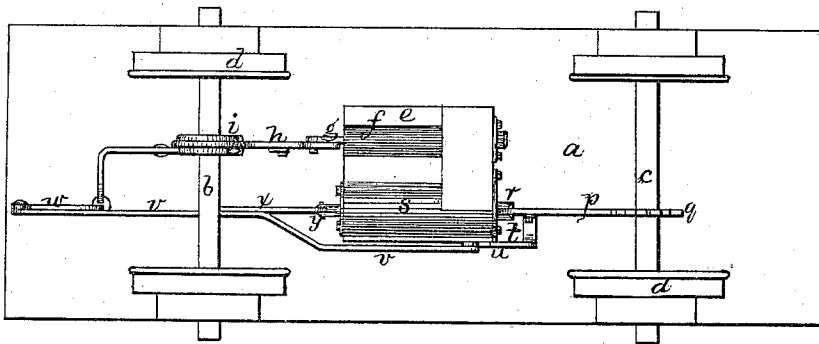
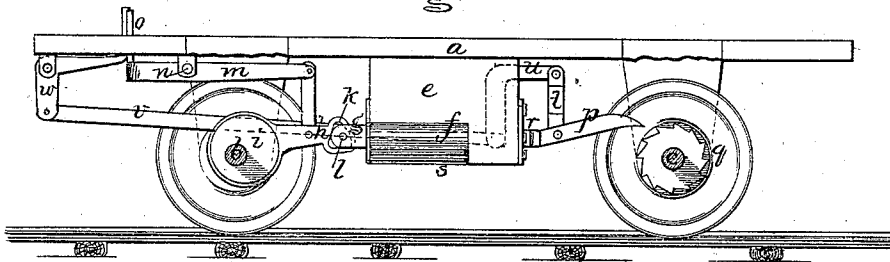


Fig. 2.



Witnesses.
Mo. W. Frothingham.
L. H. Latimer.

Inventor.
Lorenzo D. Benner.
By his Attys.
Crosby & Gould.

UNITED STATES PATENT OFFICE.

LORENZO D. BENNER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF
AND NORTHERN & FOSTER, OF SAME PLACE.

IMPROVEMENT IN CAR-STARTERS.

Specification forming part of Letters Patent No. 134,840, dated January 14, 1873.

To all whom it may concern:

Be it known that I, LORENZO D. BENNER, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Horse-Car-Starting Mechanism; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

Various contrivances have been invented and applied for starting horse-cars from a state of rest, so as to relieve the horses from much of the severe strain to overcome the inertia of the stationary car. For various reasons most if not all of such inventions have proved impractical, their operation being chiefly contingent upon the stress of springs which are compressed by the moving car, and exert their elastic force to start the car when released, (such springs soon becoming inactive or useless,) or upon lever-and-ratchet mechanisms, which, being operated by the driver or the horses, soon become disarranged and unreliable.

In my invention I use the movement and momentum of the car to compress and store air in a compressed-air tank, and so arrange the mechanism that the air-cylinder piston may be readily thrown into and out of action, a second cylinder connecting with the tank by a suitable valve being employed, in which cylinder is a piston having its rod jointed to a pawl, which pawl is connected by a link-and-lever mechanism with a rod that is also connected to the valve-stem, this rod being actuated by the driver to throw the pawl down into connection with a ratchet-wheel on one of the axles of the car, and to simultaneously open the valve, so that the compressed air from the tank will enter the cylinder and drive back the pawl-piston, thereby turning the ratchet and axle, and starting the car. It is in the combination for effecting this that my invention consists.

The drawing represents a starting mechanism embodying the invention.

Figure 1 shows a bottom view of the mechanism. Fig. 2 is a side elevation of it.

a denotes the bottom and platform of the car; *b c*, two of the axles; *d*, the wheels. *e* de-

notes an air-tank placed beneath the car or in other suitable or convenient location. *f* is an air-pump connected with this tank to supply it with air under pressure, the pump-rod *g* and its piston reciprocating in the pump-cylinder, and the piston, by means of a suitable valvular mechanism, forcing air into the tank and storing it there under pressure, or in a state of compression. The pump-rod is reciprocated by a link, *h*, worked by an eccentric, *i*, on the axle *b*, this link having a triangular slot, *k*, into which extends a pin, *l*, from the rod, the bottom of this slot, when in the plane of the pin, permitting reciprocation of the link without actuating the rod, while the top or upper angle of the slot, when in a plane with the pin, causes the rod to be actuated by the link. The link is jointed to a lever, *m*, pivoted at *n*, and having at its front end an arm, *o*, extending through the platform and accessible to the driver, who, by operating the lever, can throw the link into position to reciprocate the pump-rod, or into position to operate without moving the pump-rod, the rotative movement of the axle *b* operating the eccentric at all times. *p* denotes a pawl arranged to engage with the teeth of a ratchet, *q*, on the axle *c*. This pawl is jointed to the end of a rod, *r*, extending from a piston in an air-cylinder, *s*, connecting by means of a suitable valve mechanism with the compressed-air tank *e*. The pawl is also jointed to a link, *t*, which connects the pawl to one arm of an angle-lever, *u*, whose other arm is jointed to a long rod or bar, *v*, jointed to a lever, *w*, having a vertical arm extending through the platform into position to be accessible to the driver, who, by depressing the vertical lever-arm, throws the pawl down and into engagement with the ratchet. To the rod or bar *v* is jointed, by a link, *x*, a valve-rod, *y*, that actuates a valve to admit or cut off supply of air to the cylinder *s* to operate the piston, and by the same motion of the lever *u* that throws down the pawl the valve is opened to admit air into the cylinder *s* in front of its piston, the pressure of the air throwing back the piston and the pawl jointed thereto, and turning the ratchet to start the car. By a suitable arrangement of the valve mechanism, the piston may be reciprocated to intermittently continue

the action or pressure of the pawl upon the ratchet.

By these means the car may be readily started by the force of the compressed air, either alone or as an adjunct to the draft of the horses.

I claim—

In combination with the ratchet *q* and pawl *p*, the air-pump *f*, compressed-air tank *e*, and

air-cylinder *s*, and their connections, by which, at the will of the driver, air is driven into the tank for storage, or is let into the cylinder *s*, to work the pawl and piston-rod *r*, substantially as described.

LORENZO D. BENNER.

Witnesses:

FRANCIS GOULD,
M. W. FROTHINGHAM.