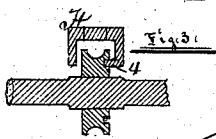
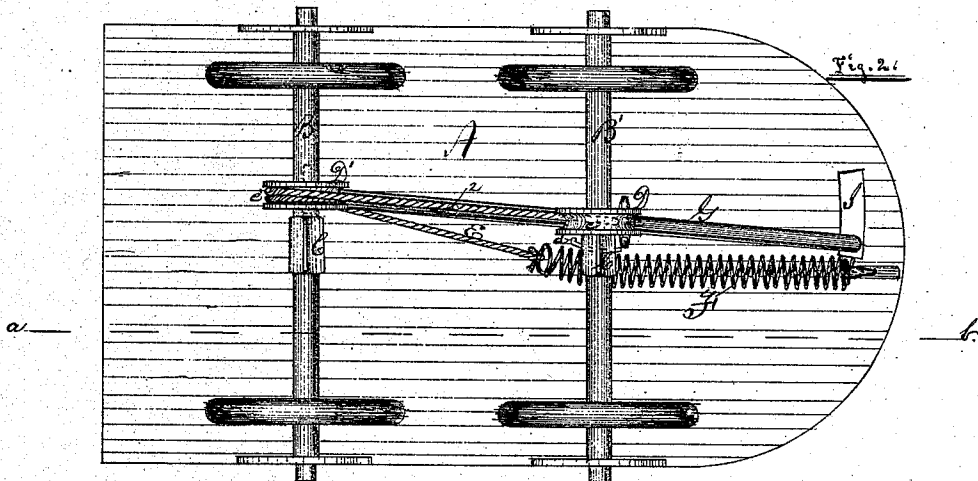
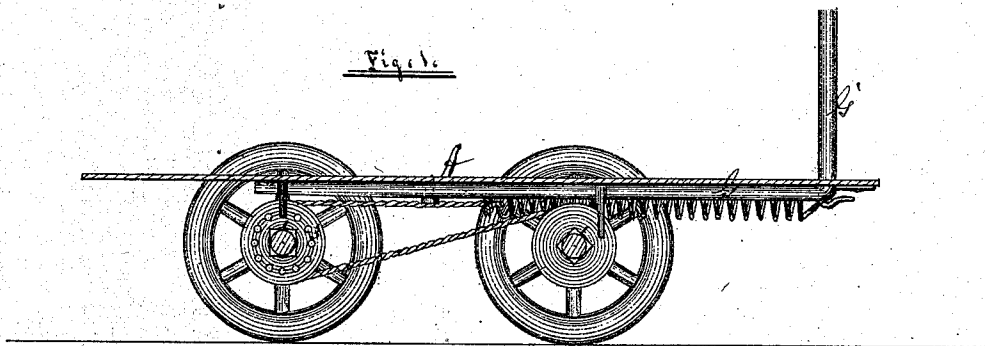


C. B. BROADWELL.  
Railway Car Starter.

No. 105,635.

Patented July 26, 1870.



Witnesses.

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CHARLES B. BROADWELL, OF NEW ORLEANS, LOUISIANA.

Letters Patent No. 105,635, dated July 26, 1870.

## IMPROVEMENT IN RAILWAY-CAR STARTER.

The Schedule referred to in these Letters Patent and making part of the same.

I, CHARLES B. BROADWELL, of New Orleans, Louisiana, have invented a certain new Apparatus for Stopping, Starting, and Backing Street Railroad-Cars, of which the following is a specification.

My invention consists of a very simple mechanical arrangement, through the agency of which the driver of a street railroad-car can stop the same, and, while doing so, develop and garner up a force to start it again or run it backward, which, at any moment, he can bring into action for that purpose.

The objects attained by me are, the supercedure of the friction-brakes now used to stop cars and the complete relief of the draft animals from the heavy and destructive duty of starting the same, which experience has demonstrated quickly so impairs their strength, or, in other words, breaks them down as to render them unfit for use, if it does not permanently cripple them.

My invention, therefore, by rendering the wearing and destructive effects of the friction-brake, as well as by securing a larger performance of service from the horses and mules employed to draw or pull the cars of street railroads, becomes of great value and importance not only to the owners of such roads, but to the public generally.

But my invention will be more clearly and quickly understood by referring to the drawing, whereon it is shown at—

Figure 1 by a sectional elevation in connection with the floor of a street railroad-car, through line *a b* of fig. 2, and at

Figure 2 by a bottom view of the same.

Figure 3 is a detached view of my device for holding the loose pulley in any given position whenever desired.

On the drawing—

A is the floor of the car, which we may suppose to be of any proper construction for city railroad purposes, and

B B' the axles of said car.

In order to apply my invention, the axles have, near the centers thereof, as shown, short sections, C, that are made perfectly square.

On the same side of these square or rectangular sections C, on each axle, is fitted pulleys, D D', which are provided with annular grooves, *c c'*, that are deep enough to receive several coils of a strong cord or chain, E.

The central openings in the pulleys D D' are rectangular, as shown at 1, fig. 1, so as to fit snugly on the square sections C C on the axles. When they are not on these sections of the axles they only touch the axles at four points, and hence, insomuch as the axles are round elsewhere, they fit on the same so loosely that they rotate easily in both directions.

One end of the cord E is securely fastened to the

pulley D, which, it will be perceived, is on the front axle, B', in the center of its circumferential groove *c*.

The cord is then passed around pulley D' from the under side, as clearly shown in fig. 1, two or three turns, and then carried forward and attached to the rear end of a spring, F, as shown.

The length of the cord E is so adjusted that all slack thereon will be taken up when the spring F occupies its normal position.

The spring is securely attached to the floor of the car at its front extremity, substantially as shown, and is prevented from coming in contact with the loose pulley D and its adjuncts by a guard or fender, *d*, (see fig. 2,) or by a removable enveloping tube.

A lever, G, is pivoted, and has its fulcrum at 2, and, extending longitudinally underneath the floor of the car, is connected with the pulleys D D' by means of a yoke-clutch, H, (see fig. 3,) for the form of the same, in such manner that when it is moved on its pivot at 2, these pulleys will be moved respectively in opposite directions and be thrown, one on the square portion of the axle on which it is mounted, and the other off the square section in its axle.

The lever G, at its front end, turns up at right angles so as to present a vertical section, G', as shown at fig. 1, to serve as a handle for the driver with which to move it either to the right or left.

A curved slot or opening, I, in the floor of the car allows the lever to be moved easily in either direction.

In order to hold the clutch immovably in place whenever the tensile force of the spring F has been developed by the winding up of the cord E around pulley D', I make a circle of small holes, 3, on one side of said pulley, and provide a projecting-pin, 4, on the proximate jaw of the yoke-clutch H, which, entering one of the holes 3, as shown at fig. 3, effectually accomplishes this purpose.

If I find it necessary to adopt the same means to hold fast the pulley on the other axle or to employ a lever in connection with each pulley in order to improve the efficiency of my apparatus, I hold the liberty of doing so, since such a duplication of the parts in question would not at all affect its mode or principle of operation. I also reserve the right to use any form of spring, whether of rubber or metal, and to apply it in any manner, in lieu of the helical spring F, if I should consider it expedient.

The operation of my invention is very simple.

Whenever the car is to be stopped the lever G is moved so as to throw the pulley D on the square section C of the front axle, and the pulley D' off the square section of the rear axle B. This instantly puts the pulley D in motion and winds on it the cord E, the pulley D' meanwhile turning loosely and taking up the cord between it and the spring F, and thereby

developing the tensile power of said spring until it attains to the point which will overcome the momentum of the car and stop it. The moment this is done the pin 4, in the yoke-clutch H, is, by a slight movement of the lever G, thrown in one of the holes 3, to prevent the retraction of the spring until the car is again to be started.

When this is to be done, the pulley D' is thrown on the square section of axle B by a counter movement of the lever G, the pulley D' being forced off the square section of the axle B' by the same movement. This brings the whole tensile force of the spring F into action, and insomuch as this force is exerted in the proper direction to rotate the axle B' so as to carry the car forward, the starting is effected thereby without the least assistance from the draft animals.

Instead of a square section to fix the pulleys on the axles, I may use hexagonal or octagonal sections, and in every case it is necessary to bevel the ends of said

sections in order to facilitate the operation of throwing the pulleys thereupon. If any exigency should require the car to be backed, it is only necessary to hold the pulley and the front axle on the square hexagonal or octagonal section thereon after the car is stopped, when the retraction of the spring will accomplish that object.

What I claim is—

The arrangement of the pulleys D D', the cord or chain E, the spring F, and lever G, as herein described, underneath the floor of a street railroad-car, when the axles of the same are provided with square sections C C, and all the parts are constructed and united and operate substantially as specified, for the purpose set forth.

C. B. BROADWELL.

Witnesses:

H. N. JENKINS,  
RUFUS R. RHODES.