

C. B. BROADWELL.

Improvement in Car Starters.

No. 124,662.

Patented March 19, 1872.

Fig. 1.

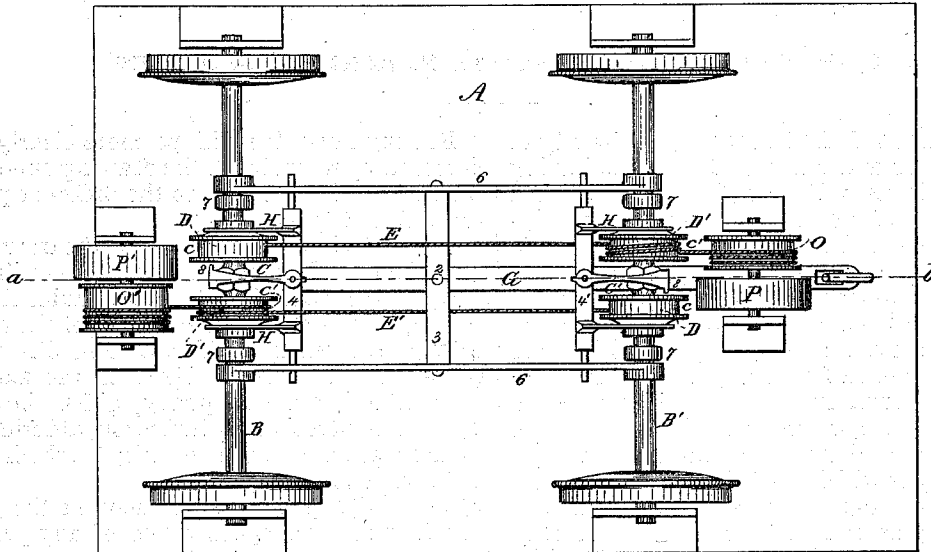


Fig. 2.

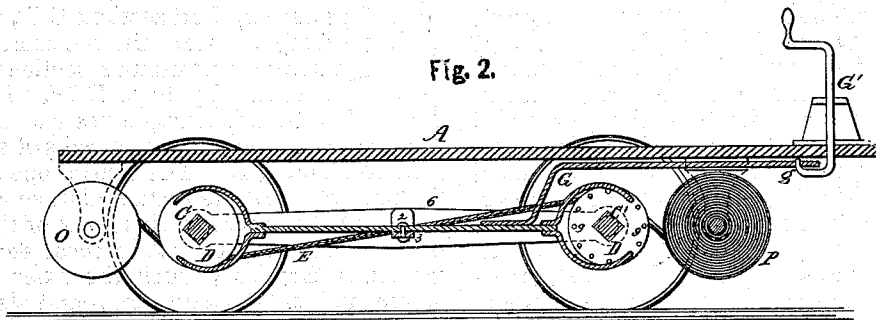
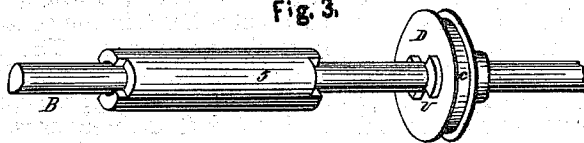


Fig. 3.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

CHARLES B. BROADWELL, OF NEW ORLEANS, LOUISIANA, ASSIGNOR OF
ONE-HALF HIS RIGHT TO PAUL COOK, OF SAME PLACE.

IMPROVEMENT IN CAR-STARTERS.

Specification forming part of Letters Patent No. 124,662, dated March 19, 1872.

I, CHARLES B. BROADWELL, of the city of New Orleans and State of Louisiana, having obtained Letters Patent No. 105,635, dated July 26, 1870, for an improvement in "railway-car starter," and having made extensive improvements upon the said patent, hereby declare the following to be a correct and accurate description and specification of my invention as improved, reference being had to the drawing annexed forming a part thereof.

My invention, like my former patent, to which reference is above made, consists of a very simple mechanical arrangement, through the agency of which the driver of a street-railroad car can stop the same with as much ease and facility as can be effected with the ordinary friction-brake in general use, and, while doing so, garner up and retain the power which has been developed and accumulated in the apparatus applied to arrest its progress, to be made available at his pleasure to start the car again entirely independently of the power of the draft animals, and consequently to their complete relief from the heavy and destructive duty of performing this work, which experience has demonstrated so quickly impairs their strength, breaks them down, renders them unfit for service, and, perhaps, permanently cripples them. The objects attained by me are, therefore, the entire supercedure of the ordinary friction-brakes now employed to stop cars, and consequently the resulting wearing and destructive effects appertaining to their use are completely obviated, as well as the securing of a large performance of service from the animals employed to draw or pull the cars of street railroads.

It is a well-known and established fact, and thoroughly demonstrated by the experience of all street-railroad companies, that more animal power is wasted and destroyed in the necessarily oft-repeated operations of starting the cars than is consumed in the labor employed to pull the cars when in motion; hence the number of animals required to draw the cars with my improvement applied is reduced to at least one-half the number necessary to use with cars without such improvement; therefore my invention 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 understood by reference to the drawing annexed, wherein the letters refer to the different parts thereof, and in which—

Figure 1 shows a plan of my apparatus in connection with the floor of a street-railroad car, together with the wheels and axles thereof. Fig. 2 is a sectional elevation of the same through the line *a b* of Fig. 1. Fig. 3 is a detached view of a clutch fixed to the axle of the car, and of a loose pulley, which shows a device for operating my invention, differing in some respects from that on Fig. 1, which will be hereinafter fully described.

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 the car. In order to apply my invention the axles have, near the centers thereof, as shown, short sections C C', that are made perfectly square. On the same side of these squares or rectangular sections C, on each axle, are 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 E'. The central openings in the pulleys D D' are rectangular, so as to fit snugly on the square sections C C' of the axles B B'. When they are not on these sections of the axles they only touch the axles at four points, and as the axles are round elsewhere they fit on the same so loosely that they rotate easily in either direction. One end of the cords or chains E is securely fastened to the pulleys D, which, it will be perceived, are on both axles B B', in the center of their circumferential grooves *c*. The cords are passed around the pulleys D', one from the under and the other from the upper side, as clearly shown in Fig. 1, two or three turns, and again around the drums O O' several turns, and then securely fastened thereto. The drums O O' are fixed to the same axles as the inner ends of the coiled springs P P', and as a consequence thereof are operated by them. These drums and springs are securely attached to the floor of the car at both ends, substantially as shown. The lengths of the cords or chains E are so adjusted that all the slack thereon will be taken up, when the springs occupy their normal positions, by the winding-pulleys D D and

drums O O'. A lever, G, is pivoted and has its fulcrum at 2, and, extending longitudinally underneath the floor of the car, is connected with all the pulleys by means of the yoke-clutches H H H H in such manner that when it is moved on its pivot at 2 the winding-up pulleys D' D', or those to which the cords are attached, are thrown into gear, and will be moved, respectively, in the same directions, and brought into operation to stop the car, by means of their contact with the square faces C C' of the axles B B' at their respective opposite ends, and thus develop the power in the springs, which is to be subsequently applied, at the pleasure and will of the driver, to start it forward. The lever G with the attendant yoke-clutches above mentioned, the pivot 2 with cross-bar 3 and cross guide-bars 4 4', are supported by the side-frame bars 6 6', having their bearings on the axles of the car, and are provided with loose journals to allow the said axles to revolve freely therein. The side-frame bars 6 6' are prevented from spreading outwardly by the cross-bar 3, and are kept from contact with the loose pulleys by means of the collars 7, which are fixed to the axles at such positions as to allow only of a limited lateral play or movement of the loose pulleys. The end of the lever G is provided with a slot, g, into the lower end of which the lever G' works, as shown, and allows the lever G to be moved easily in either direction. In order to hold the clutches H H immovably in place whenever the tensile force of the springs P P' has been developed by the winding up of the cords E E' around the pulleys D D', I make a circle of small holes on one side of said pulleys, and provide projecting pins 8 8' on the proximate jaws of the yoke-clutches, which, entering one of the holes of the said pulleys, effectually accomplishes this purpose.

I hold the liberty of reserving the right to use any form of spring, whether of rubber or metal, and to apply it in any manner, in lieu of that adopted in the present instance, should I consider it expedient. I wish to reserve the right to use the lever for the operation of my device at either end of the car or at both ends, or to apply it in any manner, as occasion may require, or as the construction of the car may indicate its adaptation. Furthermore, I may deem it essential in some cases to dispense with the double apparatus herein described, and instead thereof use only one spring and its corresponding drum, pulleys, cord, clutches, &c.

The operation of my invention is very simple. Whenever the car is to be stopped the lever G is moved by the driver simply by turning the vertical lever G', so as to throw

the pulleys D D' on the square sections C C' of both axles, and the pulleys D D' off the square sections of these axles. This instantly puts the pulleys D D' in motion and winds on them the cords or chains E E', the pulleys D D' meanwhile turning loosely and taking up the cords and passing them from the spring-drums O O', and thereby developing the tensile power of said springs until they attain to the point which will overcome the momentum of the car and stop it. The moment this is done the pins 8 8' in the yoke-clutches H H are, by a reverse movement of the lever G, thrown into one of the holes 9 to prevent the retraction of the springs until the car is again to be started. When this is to be done the pulleys D D' are thrown on the square sections of the axles B B' by a counter movement of the lever G, the pulleys D D' being forced off the square sections of the axles B B' by the same movement. This brings the whole tensile force of the springs P P' into action, and, inasmuch as this force is exerted in the proper direction to rotate the axles B B' so as to carry the car forward, the starting is effected thereby without the least assistance whatever from the draft animals.

Instead of the square sections to fix the pulleys on the axles I may use hexagonal or octagonal sections, or I may use neither of the above, but instead thereof independent but fixed clutches, as shown at 5, Fig. 3, in which case the pulleys will necessarily have projecting jaws at their sides, as shown at v, in case it is necessary to bevel the ends of said sections or jaws 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 pulleys D D' on the square, hexagonal, or octagonal sections thereon after the car is stopped, when the retraction of the spring will accomplish that object.

What I claim, and desire to secure by Letters Patent, is—

The arrangement of the pulleys D D D D, the cords or chains E E, the springs P P, with the drums O O and lever G, frame 6 6, guide-bars 4 4, as herein described, underneath the floor and upon the axles of a street-railroad car, when the axles of the same are provided with square sections C C or with a clutch, as described at Fig. 3, and all the parts are constructed and united, and operate substantially as specified, for the purpose set forth.

C. B. BROADWELL.

Witnesses:

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L. P. OLMSTEAD.