J. G. & G. M. BRILL.

Operating Car-Doors.

No. 145,839. Patented Dec. 23, 1873.

Fig. 1.

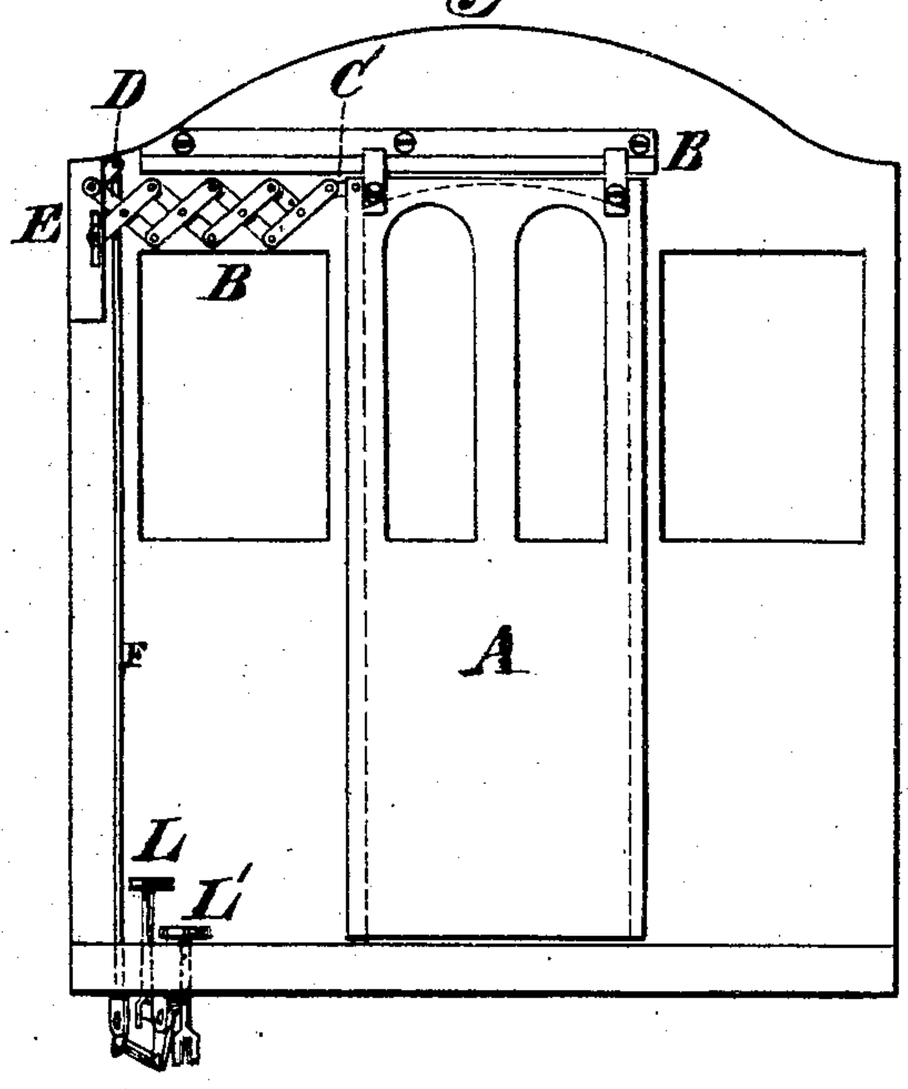


Fig. 2.

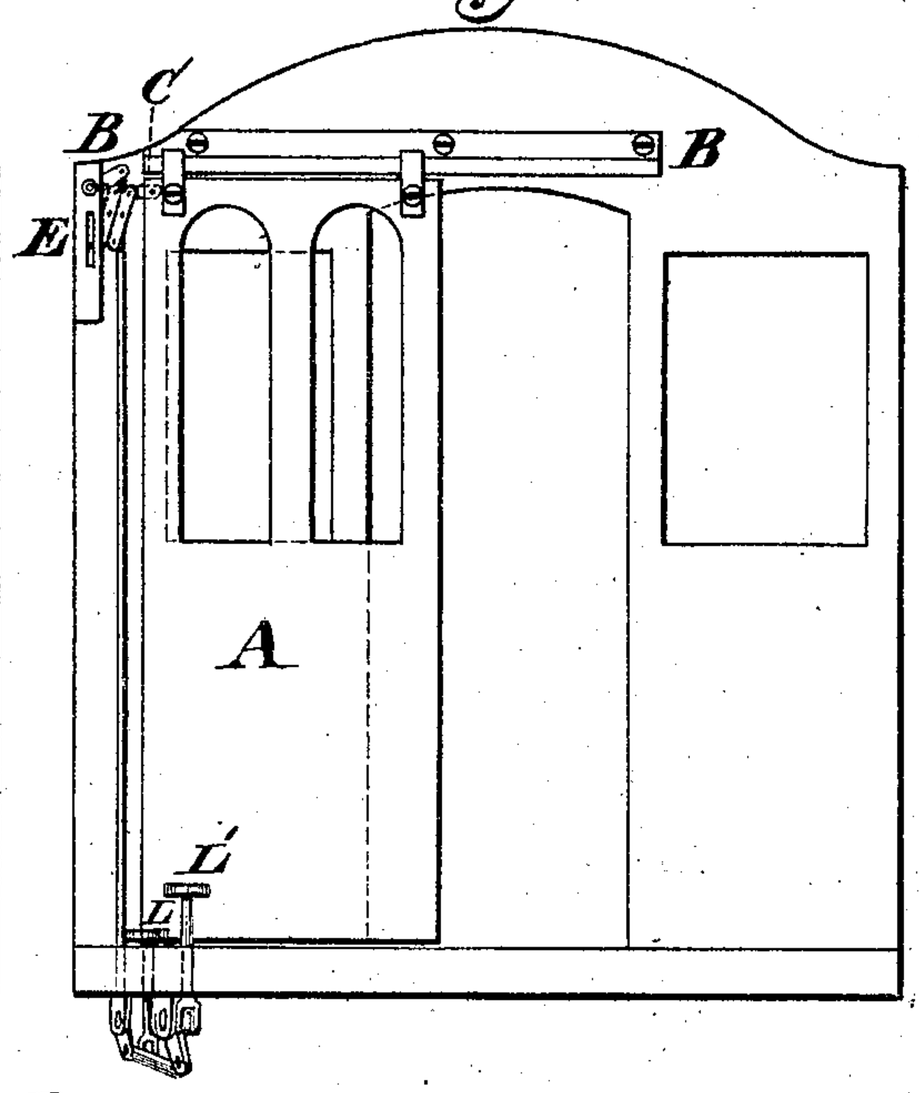


Fig. 3.

Fig. 4.

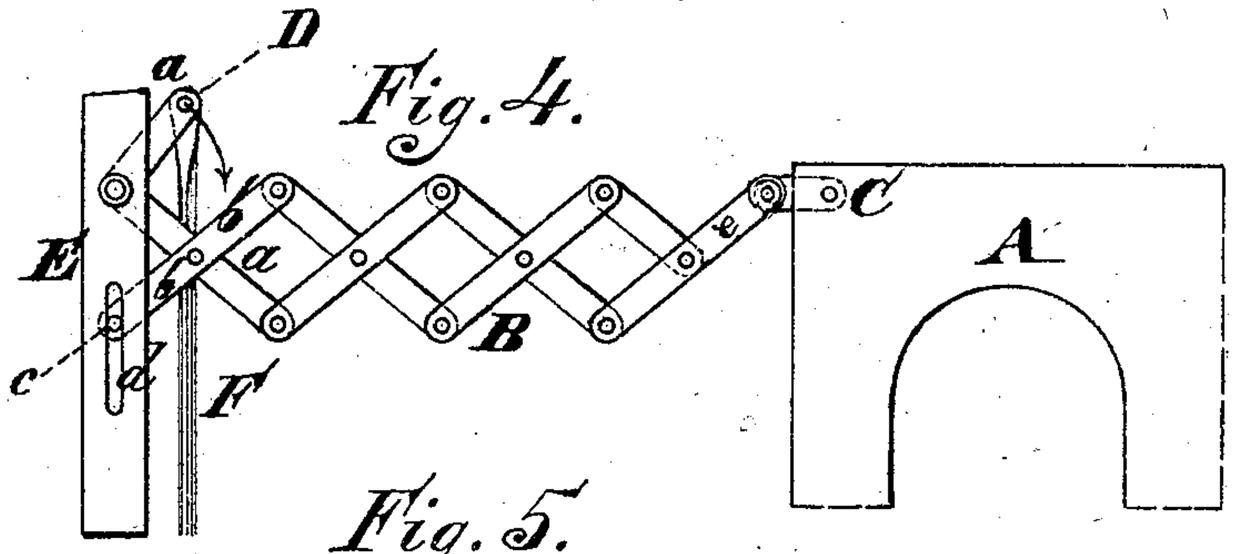
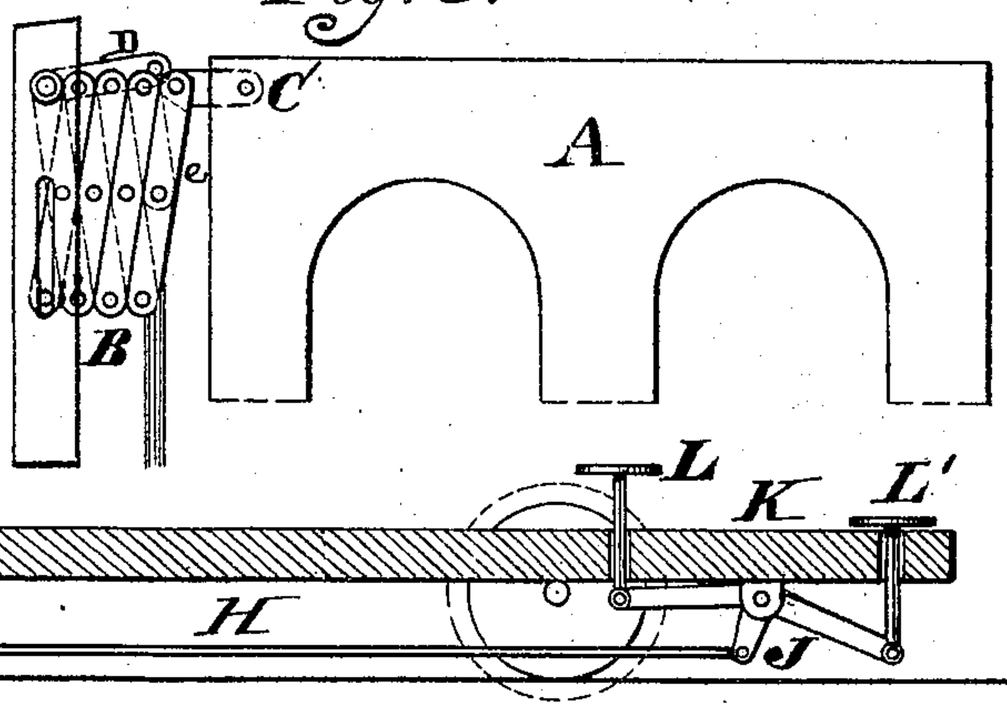


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN G. BRILL AND GEORGE M. BRILL, OF PHILADELPHIA, PA.

IMPROVEMENT IN OPERATING CAR-DOORS.

Specification forming part of Letters Patent No. **145,839**, dated December 23, 1873; application filed June 21, 1873.

To all whom it may concern:

Be it known that we, JOHN G. BRILL and GEORGE M. BRILL, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Opening and Closing Car-Doors; and we do hereby declare the following to be a full, clear, and exact description of the nature thereof, sufficient to enable others skilled in the art to which our invention appertains to fully understand, make, and use the same, reference being had to the accompanying drawings making part of this specification, in which—

Figures 1 and 2 are front views of a car, showing the door respectively closed and opened. Fig. 3 is a central longitudinal section. Figs. 4 and 5 are enlarged views of detached parts.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to car-doors which are opened and closed in right-lined sliding movements by means under control of the driver; and consists in operating the door by the employment of the well-known "lazy-tongs," in which a short motion at one end will give a greater motion to the other end, so that but slight operation is required of the driver to quickly open and close the door. It also consists in means for operating the lazy-tongs.

Referring to the drawings, A represents the door of a car, which may be of usual form and is suspended from the rail B in any suitable manner, so as to freely slide thereon in a straight or right line. B represents a number of crossed bars or levers which extend transversely and vertically at the rear of the car, and are well known as lazy-tongs, wherein a short motion at one end gives a greater motion at the other end, and the end which gives the greater motion is jointed to a bar, C, which is pivoted to the door A near its upper end. The other end of the tongs has one of its bars, *a*, formed into a bell-crank lever, D, which is jointed to a plate, E, and the other bar *b* is formed with a pin, *c*, which projects into and slides in a slot, *d*, in the plate E. To the crank-lever D there is jointed a vertical rod, F, which extends, preferably, below the floor of the car, and is there connected to a bell-crank lever, G, which is properly mounted, and has also attached to it a horizontal rod, H, which extends forward to one arm of a three-armed lever, J, mounted below the platform K of the car, and carrying, at the ends of the other two arms, levers L L′, which project above the platform and are within convenient reach of the feet of the driver.

It will be seen that the lazy-tongs open and close in the same line or direction of motion of the sliding door, so that there will be a direct action of the tongs on the door.

The operation is as follows: When the door is to be opened, the driver depresses the lever L, and thus throws the horizontal rod H to the front and lowers the vertical rod F. This lowers the bell-crank lever D and draws in or closes the crossed bars or tongs B. The door is thus caused to follow the motion of said bars or tongs, and consequently moves toward the bell-crank lever D, which operation quickly opens the door. When the door is to be closed, the driver depresses the lever L and, by means of the intermediate mechanism, elevates the rod H. The tongs are consequently expanded and impart motion to the door in the direction away from the bell-crank lever D, which operation quickly closes the door.

It will be seen that in these operations slight movements of the foot-levers L L′ cause movements to the car-door in an increased ratio, and, in the present case, at least four to one.

When the crossed bars begin their movements in closing the door, the tendency of the bar C adjacent to the door is to rise, thereby, unless prevented, elevating the door and causing binding thereof with the rail B. A similar result, unless prevented, will occur when the movement of said bars begins in opening the door, wherein the door will be drawn down, and likewise bind on the rail. These objections are overcome by means of the bar C, which is jointed to the bar *e* of the crossed bars, at the end, which gives the greater motion to said bars, as has been stated. The bar C at first moves vertically on its axis, and yet imparts a right-lined motion to the car-door, whereby regularity and reliability of the latter are at all times insured.

We are aware that car-doors moving in the

arc of a circle are opened and closed by means of crossed levers and toggles attached to mechanism operated by the driver.

In our invention the door has the usual right-lined movements. The lazy-tongs, operating therewith, do not necessitate a special construction of the door, and they occupy the space in the rear wall of the body of the car in which the door is received when opened. Said tongs fold or close so compactly that but little room is required for them. The connecting-bar between the tongs and door is such that, although the tongs are attached to the upper end of the door, binding of the latter in the frame or adjacent parts is obviated.

The front platform of the car being small, it is important to avoid cumbersome appliances for operating the door. Since lazy-tongs have quick motions at the end opposite to that to which the power is applied, the range of motion of treadles or foot-levers for the driver need be but small to impart rapid movements to the door, the latter being important, consequent to the hurry of passengers in entering and departing from the car.

These features are not possessed by toggles and crossed levers operating circular or rotary doors.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The series of crossed bars B B constituting lazy-tongs, in combination with the car-door A, to operate together in right-lined movements, the bars being jointed at one end to the door and connected at the other end to mechanism operated by the driver, as and for the purpose set forth.

2. The bar C, jointed to the door A and to the crossed bars B, substantially as and for the purpose set forth.

3. The foot-levers L L′ and rods F H, in combination with the series of crossed bars B B and the door A, substantially as and for the purpose set forth.

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