2 Sheets--Sheet 1.

J. STEPHENSON.
Street-Cars.

No. 150,907. Patented May 12, 1874.

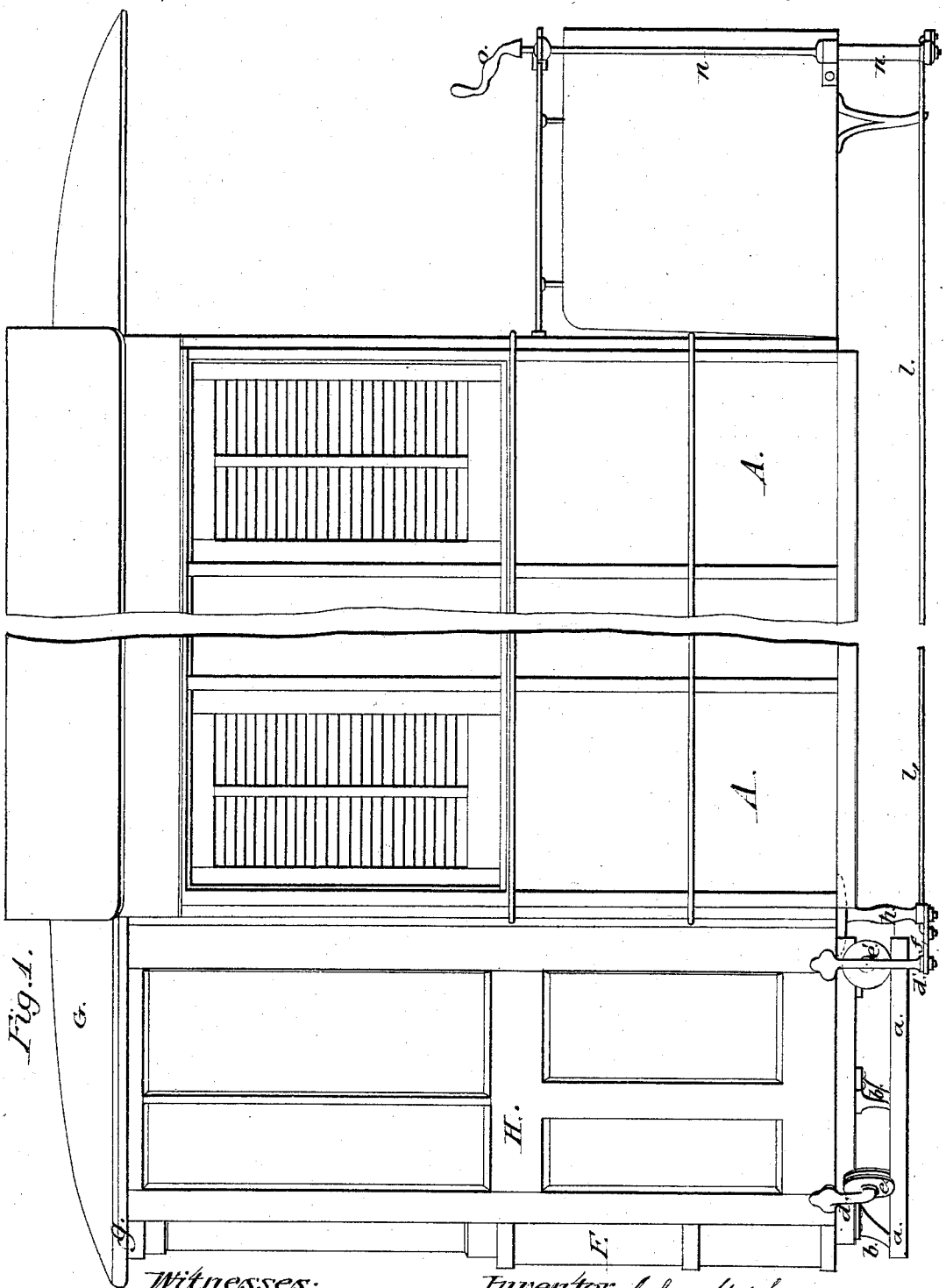

Fig. 1.

Witnesses:
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Edw. W. Down

Inventor: John Stephenson
per D. Hanney
Atty.

2 Sheets--Sheet 2.

J. STEPHENSON.

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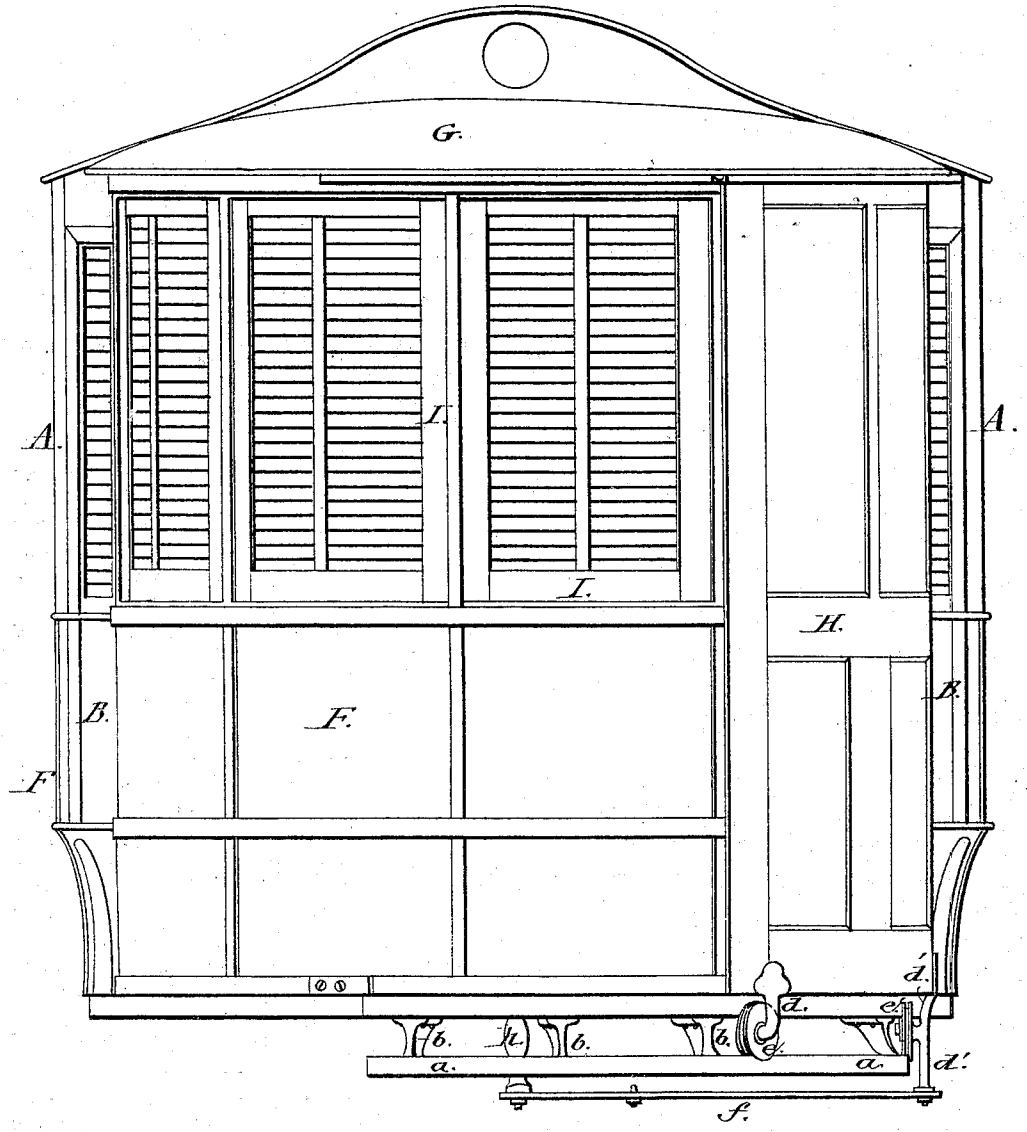
Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN STEPHENSON, OF NEW YORK, N. Y.

IMPROVEMENT IN STREET-CARS.

Specification forming part of Letters Patent No. **150,907**, dated May 12, 1874; application filed March 16, 1874.

CASE A^2 A^2.

To all whom it may concern:

Be it known that I, JOHN STEPHENSON, of New York, in the county of New York and State of New York, have invented certain Improvements in Street-Cars, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of a street-car having my improvement applied thereto, and Fig. 2 a rear elevation of the same.

My invention relates to a new and improved mode of supporting the entrance-door of a street-car, and of forming the connection between it and the mechanism through which the driver, while at his post in front, can open and close it at will without withdrawing his attention from his other duties. My improvement for this purpose (and which originally formed part of my application marked Case A A) consists, first, in hanging or supporting the door on a rail or way by means of two or more arms or legs, each carrying a sheave-wheel, which is made to rest on the supporting-rail, and the arms or legs made fast, as the case may be, to the upper or lower end of the door. Secondly, it consists in providing one or more of the arms or legs with a point of attachment for the mechanism through which the driver is enabled to operate the door.

To enable others skilled in the art to make, construct, and use my improvements, I will now proceed to describe its parts in detail, omitting a particular description of such parts of a street-car as are common to others and are not pertinent to my present improvement.

As my present improvements are equally applicable to doors of the old style of cars—that is to say, cars provided with a simple square or curved rear end—and to doors of the new style of car, having an extension in the rear, and as they are applied in the same manner to each, I have not deemed it necessary to illustrate them in the drawings as applied to both; hence, while claiming them as applied to either or both, I will simply describe them as applied to one style, and which will be amply sufficient to enable any practical mechanic, without additional invention, to apply them to any other style of car required. To this end, therefore, I have represented and described them as applied to cars having an extension in the rear.

The main body A of the car may be of the usual length and construction, with the exception of its rear end, from which the usual door pillars, panels, and other frame-work are removed, and a couple of plain side pillars, B, substituted in their place, and which are connected together at their top by an arched frame-piece, C. The floor D of the car-bottom is represented as being projected beyond the rear end of the main body A for a length sufficient to form the floor E of the new appendage or extension F of the car-body, and is or may be braced, supported, and secured to the supporting-timbers of the car in any well-known way; but it is preferred to make the floor E independent of floor D, so that the extension F shall in all respects constitute an independent appendage in its construction, although firmly secured to the rear end of the car. The extension F may be of any suitable form; but the curved form is preferable. This extension is provided with a supplementary roof, G, and with an opening or openings for the door or doors H. If two doors are used, then they will be arranged as shown in Fig. 4, one on each side of the extension; but if one alone is used, as shown in Figs. 1 and 3, it may be arranged at any convenient place in the extension, although a single door arranged at the right-hand side has proved desirable. The door or doors I are arranged to move in a guideway, *i*, cut or otherwise suitably formed in the frame-work on the under side of the roof G, and that either on the inside or outside, according as the door is intended to move on the inside or outside of the car.

The door for this purpose may be supported in two different ways. First, by being suspended from the top; and, secondly, by being supported from below, the same means being sufficient for both—that is to say, the means being called arms when they suspend the door from above, and legs when they support it from below. When the door is suspended from above, the arms are secured to its top at or near its corner, and each is provided with an axis, upon which is mounted a roller or sheave-wheel. A rail is then suitably suspended from the roof, and that either on the inside or outside, ac-

cording as the doors are intended to slide on the inside or outside of the car, and the rollers made to rest and move thereon. Thus arranged the door is hung and ready for work, and may be made to slide back and forth, either by the conductor or by the driver from his stand in front, in which latter event suitable mechanism for that purpose must be connected with the door, and which I will hereafter refer to. Or the door may be supported from below by attaching the same devices to the bottom of the door, and which may then be termed "legs." This is the form in which my improvements are illustrated in the drawings, and the legs referred to are marked *d d'* and the supporting-rollers *e e'*. These legs and rollers may be so arranged as to rest upon a rail on the bottom or floor of the car, in which event the door would slide on the inside of the car; but I prefer to arrange them so as to rest on a rail, *a*, arranged at the rear end and beneath the floor of the car, in which case the door is made to slide on the outside of the car. In all cases the shape of the door for this purpose must be made so as to conform to the shape of the end of the car or of the extension to which it is applied. The rail *a*, whether suspended from the roof or bottom of the car, is supported by means of two or more brackets, *b*, suitably secured to the former, both being so arranged as to conform to the shape of the extension or rear end of the car, as the case may be; and when arranged below the car, it must also be so arranged as to lie within the outer edge of the floor of the extension. To prevent undue strain on the floor or roof by attaching the brackets *b* directly to it, a block or timber, *c*, of suitable shape, may be interposed between the brackets and it, the block being secured to the car-floor, and the brackets to the block. The legs *d d'* are made to extend downward, the foot of the one leg, *d*, forming an axis for the door-roller or sheave-wheel *e*, and the foot of the other leg, *d'*, resting in a lever, *f*, which operates the door, while a spur from the same leg forms an axis for the other sheave-wheel, *e'*. The two wheels *e e'* rest upon the rail, and thus support the door. These wheels *e e'* are grooved or flanged, so as to embrace the sides, as it were, of the rail *a*, in order to prevent their displacement. The lower end of the leg *d'* rests in a bearing formed in the end of a lever, *f*, as before stated—that is to say, the leg is pivoted to the lever, and the lever, in turn, to a stud-pin or pivot, *h*, firmly attached or secured to the bottom of the car, and at such point as will make the lever thus pivoted a radius of the circle of which the extension F is a segment, so that, as the lever *f* is turned around its pivotal center, it will, through the leg *d'*, open or close the door according to the direction in which the lever is moved.

The lever *f* itself is operated by means of a connecting-rod, *l*, the one end of which is pivotally attached to the lever, and the other to a crank, *m*, made fast to a rock-shaft, *n*, arranged at the front of the car, and which carries a crank handle or lever, *o*, at its upper end, by which the driver is enabled to open or close the door, as circumstances may require.

The same devices, slightly modified and connected to my improved arms or legs *d d'*, may be applied to the operating of the entrance-door of a square-ended car, or to the door of an extension where it has to be moved in a straight line—as, for instance, in an extension where its sides are set at an angle to each other, thus ⊓ ; or, in other words, where a horizontal section of the extension would present the main features of a longitudinal section of the frustum of a cone; or, if desired, both legs, *d d'*, may be provided with a foot-like leg *d'* for attachment to the operative mechanism.

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

1. In combination with the body of a street-car, two or more brackets, *b*, and rail *a*, for the purpose set forth.

2. The combination of a door, H, with two or more arms or legs, *d* or *d'*, and sheave-wheels *e e'*, substantially as and for the purpose set forth.

3. The combination of a street-car door, H, carrying two or more arms or legs, *d d'*, and sheave-wheels *e e'*, with a rail, *a*, suitably supported, as and for the purpose set forth.

4. In combination with a car-body, A, an entrance-door, H, provided with one or more arms or legs, *d'*, as a means of attachment to the mechanism by which to operate said door from the front of the car, as set forth.

5. In combination with the entrance-door of a street-car, which is hung or supported on two or more sheave-wheels, *e e'*, one or more arms or legs, *d'*, for attachment to the mechanism by which to operate said door from the front of the car, as set forth.

In testimony whereof I have hereunto set my hand to this specification.

JOHN STEPHENSON.

Witnesses:

D. G. STUART,

P. HANNAY.