

No. 622,656.

Patented Apr. 11, 1899.

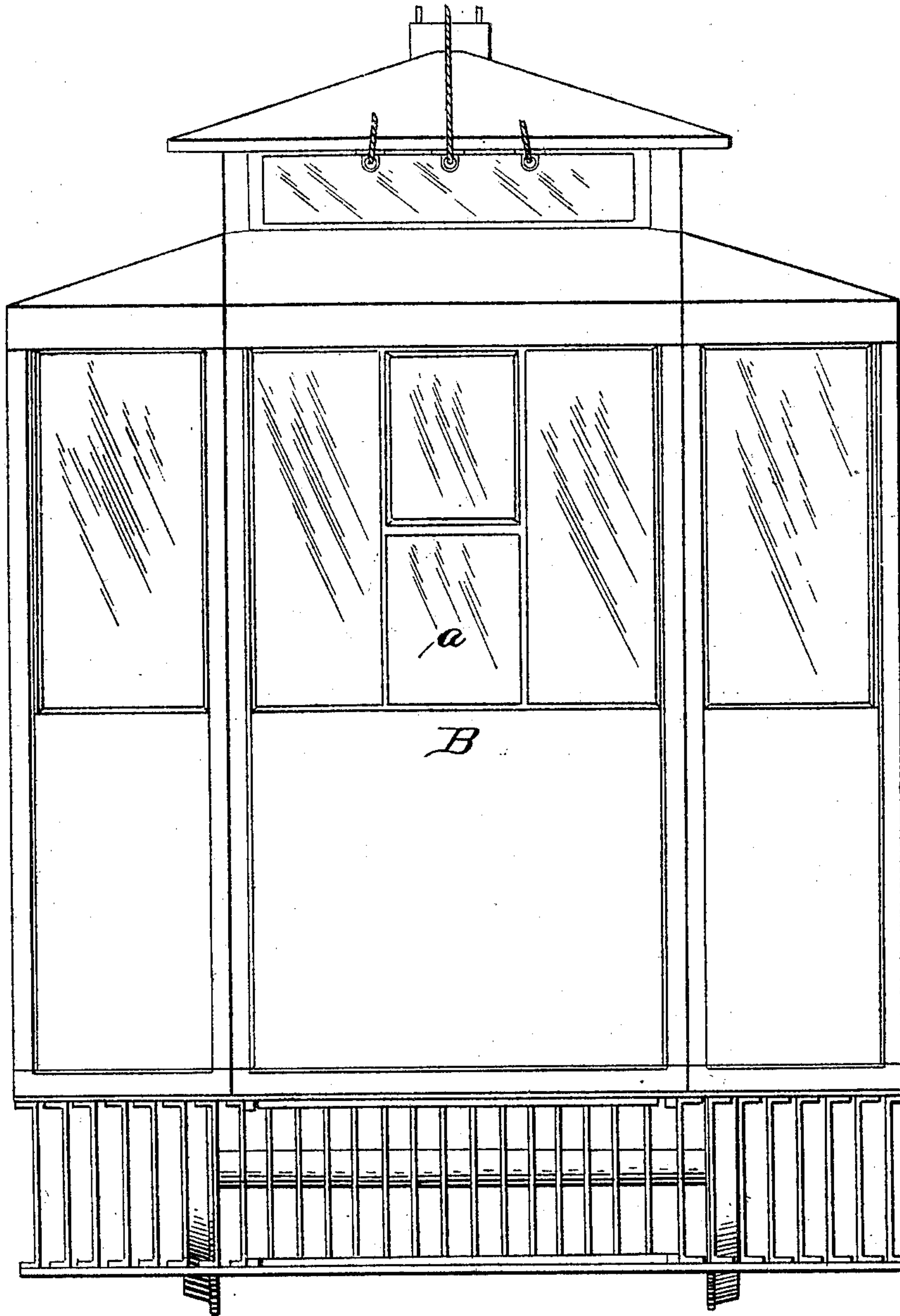
E. G. ALLEN.
STREET RAILWAY CAR.

(Application filed Mar. 17, 1898.)

(No Model.)

5 Sheets—Sheet 2.

Fig. 2.



Attest
Walter Donaldson
C. S. Maddison

Inventor
Elbridge G. Allen.
by Ellis Spear
Atty

No. 622,656.

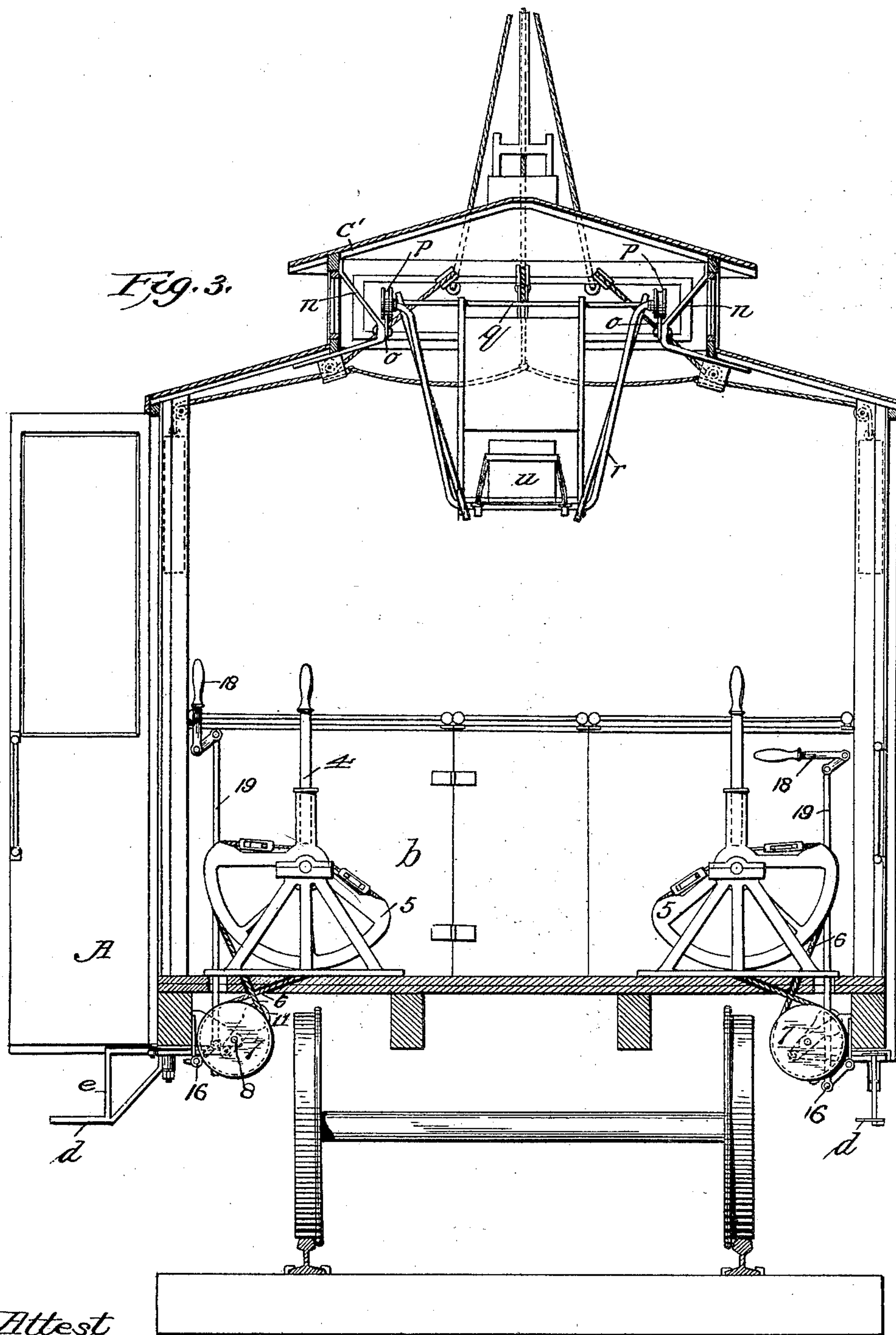
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Attest
Walter Donaldson
C. S. Middleton.

Inventor
Elbridge G. Allen
by Ellis Spear, Attorney.

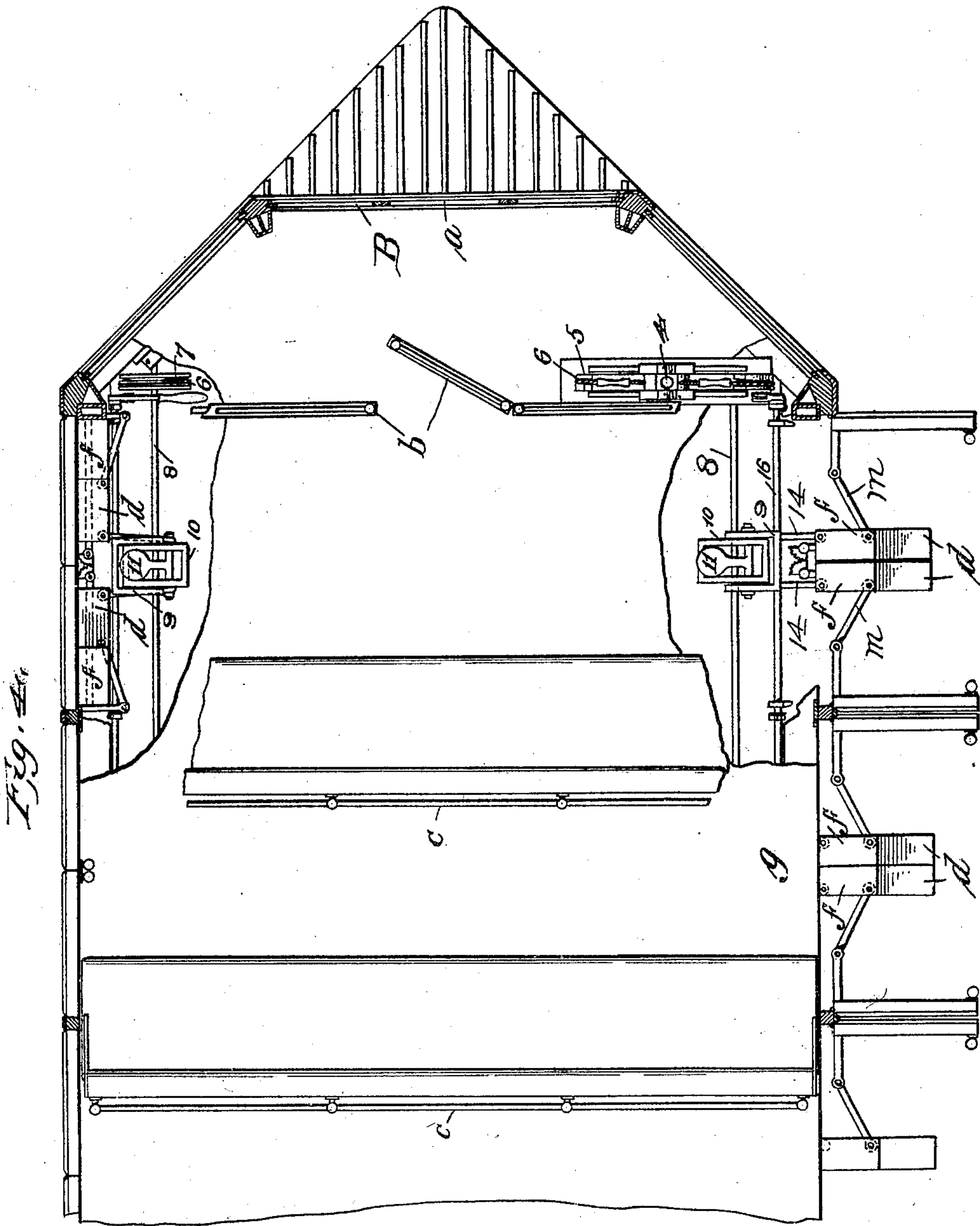
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Attest
Walter Donaldson
C. S. Middleton

Inventor
Elbridge G. Allen
by Ellis Spear
Fifty.

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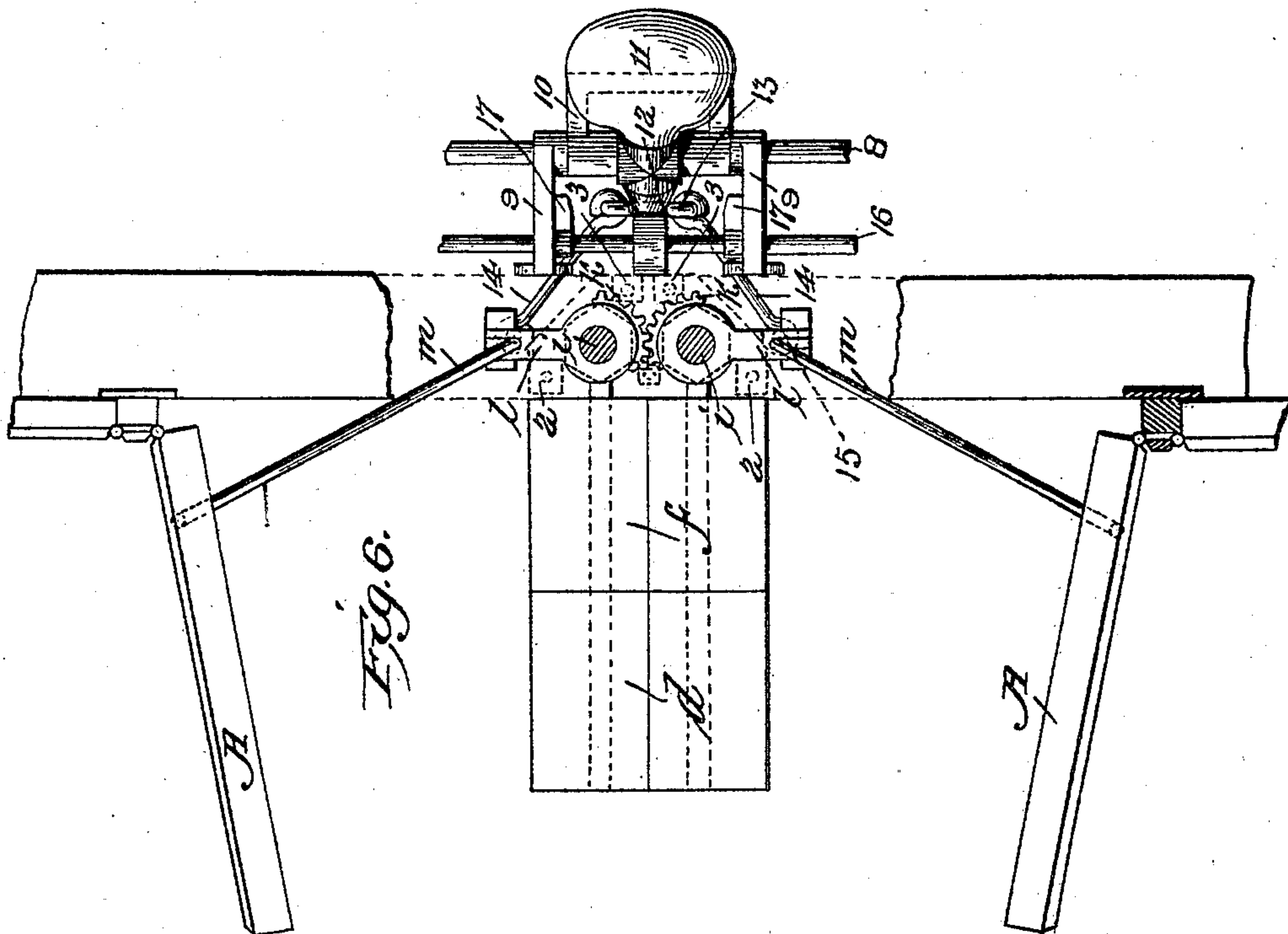


Fig. 6.

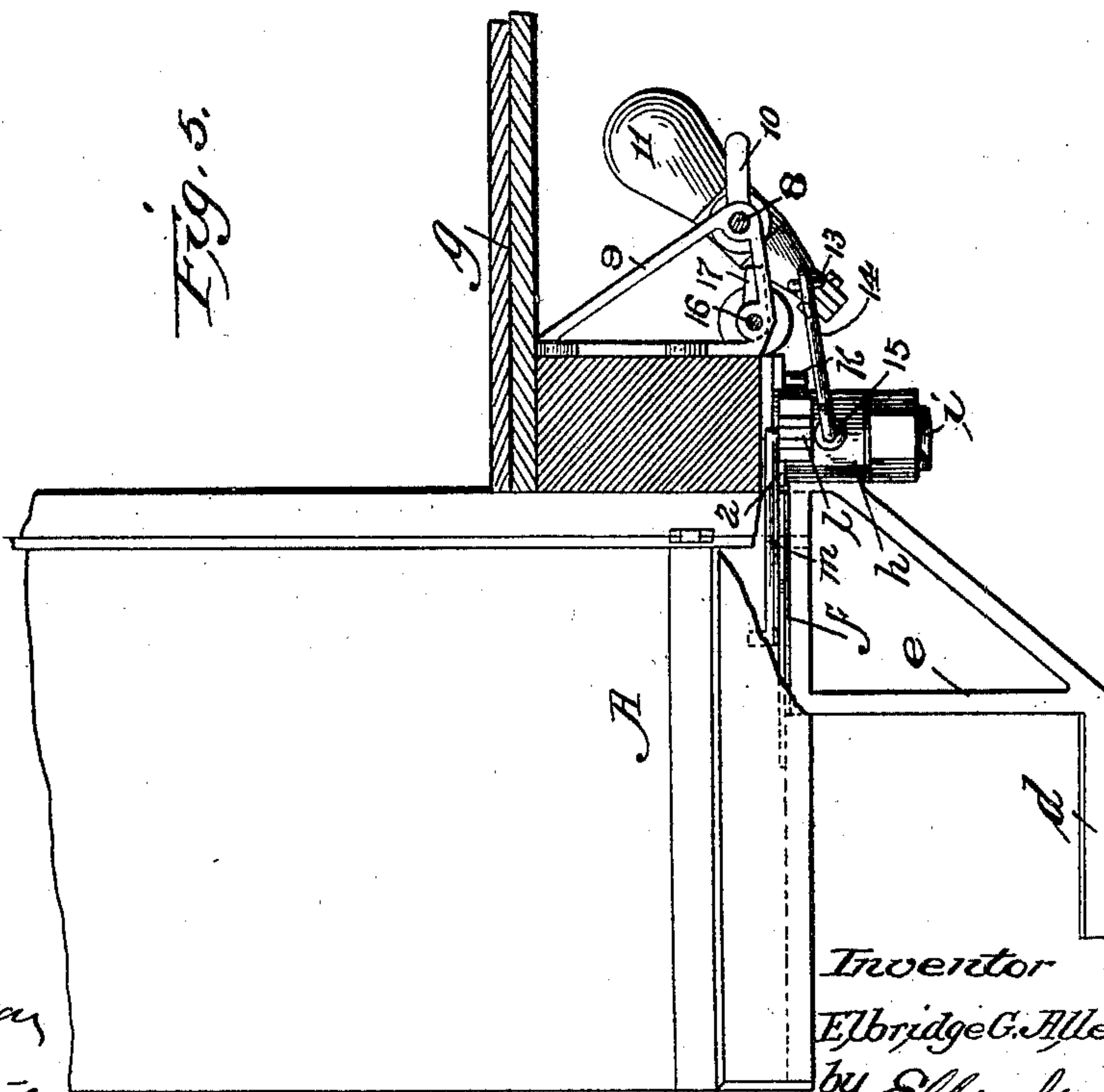


Fig. 5.

Attest
Walter Donaldson
C. S. Maddison

Inventor
Elbridge G. Allen
by Ellis J. Allen
Atty.

UNITED STATES PATENT OFFICE.

ELBRIDGE GERRY ALLEN, OF BOSTON, MASSACHUSETTS.

STREET-RAILWAY CAR.

SPECIFICATION forming part of Letters Patent No. 622,656, dated April 11, 1899.

Application filed March 17, 1898. Serial No. 674,214. (No model.)

To all whom it may concern:

Be it known that I, ELBRIDGE GERRY ALLEN, a citizen of the United States, residing at Boston, county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in Street-Railway Cars, of which the following is a specification.

In the management of street and suburban railways it is necessary, as the cars in use are constructed, to provide two equipments—namely, a set of closed cars for winter and stormy weather and open cars for summer and pleasant weather—and it is specially annoying and expensive to change from one form of car to the other, as is very often required in the fall and spring of the year when the day begins cold and turns out warm, or vice versa, and it is a matter of great discomfort to the passengers to sit in an open car when the weather turns suddenly cold before the end of the trip is reached or to sit in a hot closed car when the weather changes from cold to warm. The cost of two equipments is very great to the railway companies, and it is a matter of serious anxiety to know whether at the beginning of the day closed cars or open cars shall be run. A further difficulty exists in connection with the open or summer cars by reason of the running-board, which extends lengthwise of the car on each side, as, while these boards are primarily intended simply to serve as a step to reach the floor of the car, it is impossible to prevent passengers when the cars are crowded from standing upon the boards and making the trip in this exposed and dangerous position. Indeed, most of the accidents which occur are due to falls from the running-board by reason of the rapid running of the cars and especially in rounding sharp curves or in meeting with obstructions.

It has been my aim in the present invention to provide a car which may be used with equal facility and comfort in all seasons and which may be readily changed from a closed to an open car, or vice versa, thus reducing the equipment one-half and making it possible to meet all emergencies with the one set of cars. This is not only very important in the matter of expense in the cost of the equipment, but is material in reducing the maintenance, and, further, it provides a car which

perfectly fills the needs of the passengers and enables them to ride comfortably and to provide against any sudden changes in the weather.

Another object of the invention is to dispense entirely with the objectionable and dangerous running-board, and in view thereof I substitute a swinging step which is in proper position, ready for use when the doors of the car are open but which are swung under the car out of the way when the doors are closed, thus rendering it impossible for any one to stand upon them or to ride upon the car in an exposed and dangerous position.

A further object is to render it possible to utilize the full width of the car-body for seats and to enable the conductor to collect the fares from a position above the seats, thus rendering unnecessary an aisle or passage longitudinally of the car.

In the accompanying drawings, Figure 1 is a side elevation of the car, showing some of the doors closed and some open. Fig. 2 is an end view of the car. Fig. 3 is a sectional view showing the means for closing and locking the doors. Fig. 4 is a plan view in section of one end of the car. Figs. 5 and 6 are enlarged details showing the operating connections to the doors and steps.

As shown in Fig. 1, I make the car after the manner of an ordinary summer-car, with the seats extending from side to side; but instead of having an open car at the sides or only closed in by curtains, as is ordinarily the case, I close the openings by doors A, these doors being preferably arranged in pairs for each opening, the lower portions or panels being preferably solid, while the upper halves of the doors are provided with sliding glass panels adapted to be lowered into spaces in the lower solid panels when it is desired to have an open or summer car and to be raised to close the open panels when the state of the weather requires this to be done. The lower solid panel serves as a protection even in summer-time, while the open panels above allow ample ventilation, and at the same time the movable panels are under control to be raised or lowered, as may be found desirable.

As shown in Figs. 2 and 4, I close in the ends of the car with solid lower panels and glass panels above, these glass panels being

also adapted to be raised or lowered to provide perfect ventilation. The central window B, I divide into three panels, the center one of which, *a*, may be hinged and under the control of the motorman to be opened or closed, as he may desire. The motorman in this construction is as fully protected as the passengers, and the car is open from end to end, there being but a low partition *b* dividing the end section of the car from the body, as shown in Figs. 3 and 4.

In arranging the seats I provide sufficient space between the back of one and the seat portion of the next in order to allow, when the car is crowded and all the seats are occupied, for standing room between the seats, and in order to give support to those who may be standing I extend rods *c* from end to end at the back of each seat at top and bottom, the lower rods being used when the backs are reversed.

In order to provide for easy ingress and egress from the car, I have arranged a double step, one for each door, and these steps are adapted to swing outwardly from beneath the car and to come together when the doors are open to make a broad step between the floor of the car and the ground. As shown in Fig. 1, the steps are beneath the car out of the way when the doors are closed, and when the doors are open they occupy a position at right angles and are ready to be utilized by the passengers. The steps are arranged in pairs, one for each door, and move in unison with the movement of the doors, and this movement is effected by connecting the steps together and providing connections between the steps and the doors and with other connections from these parts to the position of the motorman, so that should the doors be left open by the passenger the motorman without leaving his position will be enabled to close and lock them, and the operating connections are such as to permit all the doors upon one side which may be open to be closed at one operation. Each step of the pair is composed of a lower horizontal part *d* and riser *e* and a second horizontal part *f*, and from the part *f* the passenger steps to the platform *g* of the car. Each step, at the rear, is provided with sockets *h*, fitting a bearing pin or projection *i* and adapted to turn in horizontal plane thereon. The socket parts are provided with teeth constituting the segment of a circle, as at *k*, and these teeth mesh, so as to make the movement of the two steps uniform and in unison. From the socket *h* extend projecting arms *l*, and these arms are connected to the doors by rods *m*, the ends of these rods being bent at right angles in opposite directions to the body of the rod, one end fitting a recess in the bottom of the door and the other end fitting an opening in the projections *l*. It will thus be seen that a positive connection is formed between the doors and steps of each opening, and as the doors are opened the projections *l* are drawn upon to move the steps outwardly into

contact with each other, as shown in the left-hand part of Fig. 1 and in plan view, Fig. 6. The parts are secured to the under face of the sill of the car, as shown in Fig. 5, and I utilize the nuts on the ends of bolts passing into the sill as stops for the projections *l* in their two positions, the nuts 2 serving as stops against which the projections abut when the doors are open, and when the doors are closed and the projections are a quarter turned to the rear they abut against the nuts 3, and thus a firm support is furnished the parts in both positions. As shown in Fig. 6, the tread of each step is made narrow and really constitutes but half of the full step, as when the doors are open the steps come together, as shown, and form a broad tread. I prefer to have the doors of each opening capable of being opened by the passenger, though each pair of doors work in unison, and upon operating one door the companion door will also open or close. As it is likely, however, that passengers in hastily entering or leaving the car will permit the doors to stand open, it is desirable that the closing of the doors be under the control of the motorman, so that before the car starts he may easily and quickly shut all the doors which may have been left open, and in order to accomplish this by one operation I have devised a very simple mechanism, which I have illustrated in Figs. 3, 4, 5, and 6. A hand-lever 4 is connected through a segment 5 and a crossed cable 6 with a wheel or pulley 7, this pulley being secured to the end of a shaft 8, which extends the full length of the car beneath the floor. This shaft is suitably supported in brackets 9, extending out from the position of each pair of steps. The shaft 8 turns freely in the bracket-supports; but secured to the shaft 8, intermediate of the arms of the brackets 9, is an open frame 10, and this frame moves with the shaft, being rigidly secured thereto. Between the ends of this frame 10 is a weight 11, loosely mounted on the shaft and with its upper end enlarged, as shown in the figures mentioned, and this enlarged end rests normally upon the outer part of the frame 10. The lower end of the weight extends below its pivotal point, where it is provided with a cross-piece 12, having eyes 13 at each end, and these eyes are engaged by links 14, which extend to eyes 15 on the under side of the projections *l*. Now it will be seen that on the turning of the shaft 8 the frame 10 will lift the weight 11, and it will be caused to turn upon its pivot to the opposite side of the shaft 8, and this will draw upon the said projections and have the effect of closing the doors and moving the steps back beneath the car-sill. One movement of the shaft is sufficient to close all the doors that may be open, and by reason of independent action through the weights the movement of the lever is without effect upon the doors that are already closed. The eye connections between the lower end of the weight and the projections *l* give sufficient

freedom of movement to prevent binding in the tilting of the weight from one position to the other. I arrange a like mechanism upon the opposite side of the car to close the doors upon that side.

I have also aimed to prevent the opening of the doors while the car is in motion, and to this end I arrange a simple locking means, also under the control of the motorman, by which the doors may be locked in their closed position and kept locked until released by the motorman. To accomplish this, I provide a second shaft or rod 16, extending lengthwise of the car and also supported in the brackets 9, preferably between the shaft 8 and the sill of the car. This rod carries just within the line of the brackets projections 17, rigidly secured to the rod 16, and the rod is manipulated to turn these projections into a horizontal or vertical position to unlock or lock the operating mechanism of the doors by a hand-lever 18, connected with the rod 16 through a vertically-extending connecting-rod 19. After the doors are closed and the projections 17 are swung around into the position shown at the right of Fig. 3 the lever 18 is depressed, and the effect is to turn the rod 16 and to move the projections 17 into a vertical position in contact with the outer edge of the projections 1, thus preventing their movement and holding the doors closed.

I do not wish to be understood as limiting myself to a pair of doors, as one wide one may be used instead of the pair and one step instead of the two steps; but I prefer the construction described.

The advantage of a running-board has been that it permits the entire width of the car for the seating of the passengers and renders unnecessary any longitudinal passage or aisle, the conductor passing from one seat to the other through the medium of the running-board. I secure the same result by dispensing with the running-board and providing a carrier for the conductor supported in the monitor of the car, this carrier being capable of movement from end to end and adapted to be occupied by the conductor and to allow him to pass over the heads of the passengers to collect the fare. This is principally shown in Figs. 1 and 3, the monitor of the car being shown at *c'*, and within this brackets *n* extend, of angular shape, these brackets supporting rails *o*. The carrier is mounted upon wheels *p*, having a groove and a rubber-covered tread, the rear wheels being connected by a straight axle *q*, while the front wheels are connected by a bent axle *r*, which extends downwardly to form a support for the floor of the carrier. This floor or seat is shown at the left of Fig. 1, is pivotally supported at the point *t*, and has a foot-piece *u* extending at right angles to the seat *s*. Horizontal brace-rods *v* connect the front and rear wheels, and angular braces extend from the rear wheels to the point *t*, as shown at *w*. Downwardly-extending side supports *x* con-

nect the wheels with the rear of the seat *s*, and these supports are slotted, as shown, so that the conductor can readily swing the floor of the carrier into the position shown in dotted lines to the left of Fig. 1, step upon the footboard, and then swing the floor *s* into the position shown in full lines, after which he may draw himself along through the car and collect the fare from the passengers. I do not wish to be understood to limit myself in this connection, as I may arrange the seats in any improved or well-known manner to leave an aisle, so as to allow the conductor to collect fare in the ordinary way, as the improvements heretofore described are obviously equally as well adapted to cars having aisles as to cars having an overhead carrier for the conductor, as has just been described.

I claim—

1. A railway-car having a series of openings in its sides, a series of doors closing said openings, a step for each door connected and moving with the door and means under the control of the motorman for closing the doors upon each side at one operation, substantially as described.

2. A railway-car having a series of openings in its sides, a series of doors closing said openings, said doors being arranged in pairs, a pair of steps connected together and to the doors whereby in the opening of the doors the steps are moved outwardly into contact to make broad treads and in the closing of the doors are moved inwardly in opposite directions beneath the car and out of the way.

3. A railway-car having a series of openings in its sides, a series of doors closing said openings, steps connected and moving with the doors means for closing the doors and means for locking the doors closed, said closing and locking means being under the control of the motorman, substantially as described.

4. A railway-car having a series of openings in its sides, a series of doors closing said openings, a series of steps connected to and moving with the doors, a single rod extending lengthwise of the car on each side, a lever for operating the rod at the end of the car and connections operated by said rod for closing the doors, substantially as described.

5. In a railway-car a pair of doors and a step for each door, said step portions being geared together, connections between the doors and the steps, a weight for closing the doors and moving back the steps, and means for operating the weight, substantially as described.

6. In a railway-car, a series of doors arranged in pairs, independent means for closing the doors of each pair, and means common to all the doors for operating the actuating devices of each pair of doors, substantially as described.

7. In a railway-car, a series of doors, means for closing said doors under the control of the motorman, a rod extending lengthwise of the car on each side and independent of the means

for closing the doors, said rod carrying locking means to hold the doors closed and means for actuating said rod, substantially as described.

5 8. In a railway-car, a series of laterally-extending seats and a carrier for the conductor adapted to traverse the upper part of the car from end to end, substantially as described.

10 9. In combination with a car having its seats extending from side to side, a series of doors with steps connected therewith and a carrier for the conductor with a track for said carrier located in the upper part of the car, substantially as described.

15 10. In combination, in a railway-car with a series of laterally-extending seats, a carrier for the conductor, said carrier running upon rails and having a tilting portion adapted to allow easy access to the carrier, substantially
20 as described.

11. In combination in a car, of a series of doors in the side thereof capable of being

opened freely, and means common to all the doors upon each side for closing said doors from the position of the operator, substantially as described. 25

12. In combination with a car, the series of steps movable laterally at the side of the car and capable of independent action with means for folding the said steps inwardly controlled
30 from one point on the car, substantially as described.

13. In combination with a car, a step made up of sections adapted to fold toward and from each other to make a complete step or to fold
35 out of the way with means for operating the said sections, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ELBRIDGE GERRY ALLEN.

Witnesses:

ALBERT W. MARTIN,
GEORGE A. SNOW.