

(No Model.)

2 Sheets—Sheet 1.

F. MANSFIELD.
STREET CAR DOOR.

No. 472,737.

Patented Apr. 12, 1892.

Fig. 1.

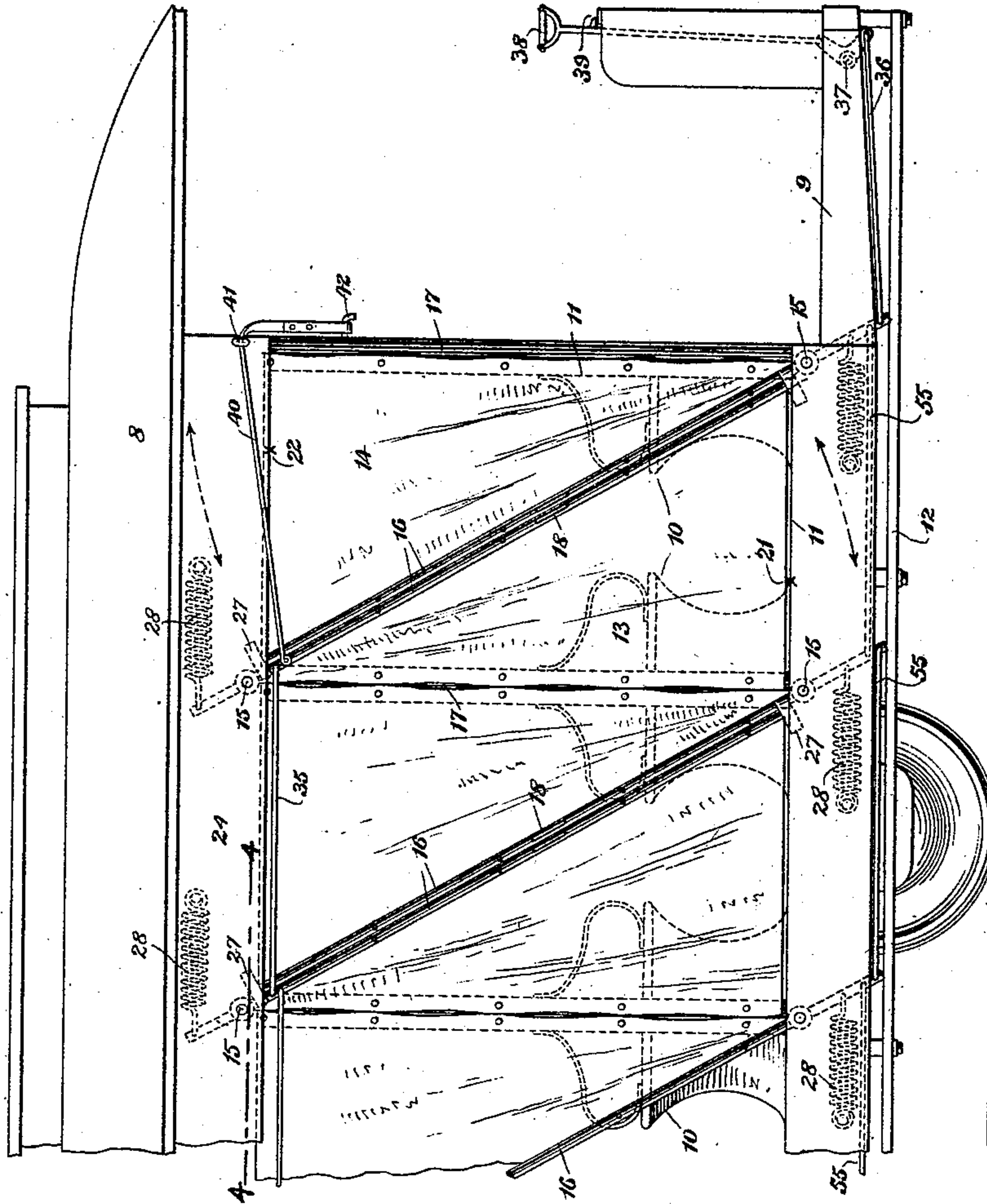


Fig. 6.

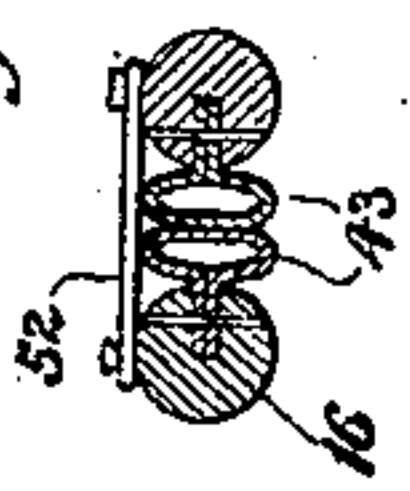


Fig. 8.

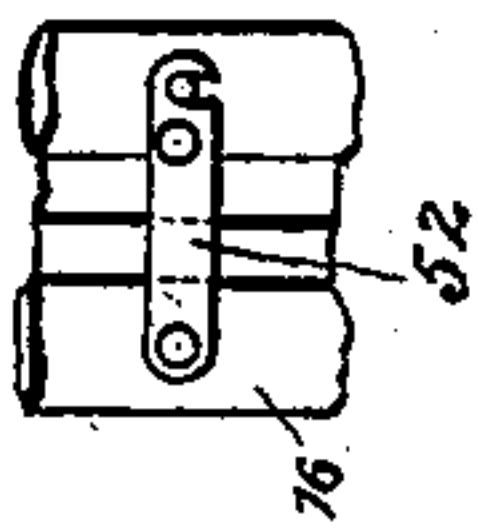


Fig. 5.

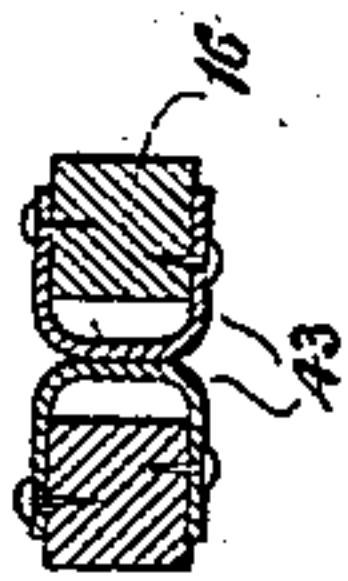


Fig. 2.

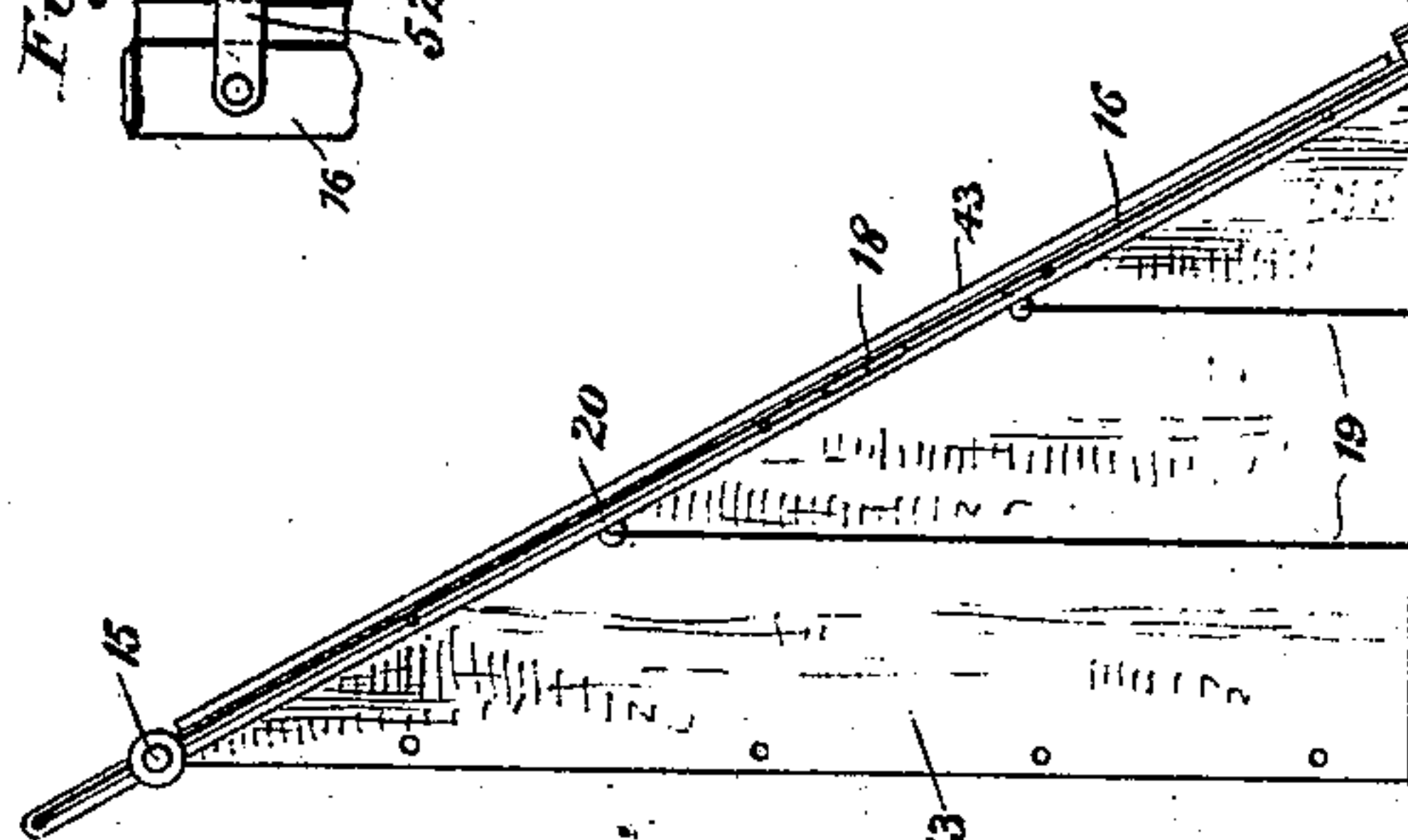


Fig. 4.



Witnesses
Geo. W. Oreck.
Henry W. Lloyd.

Inventor
Frank Mansfield.
By his Attorneys
Fowler & Fowler.

(No Model.)

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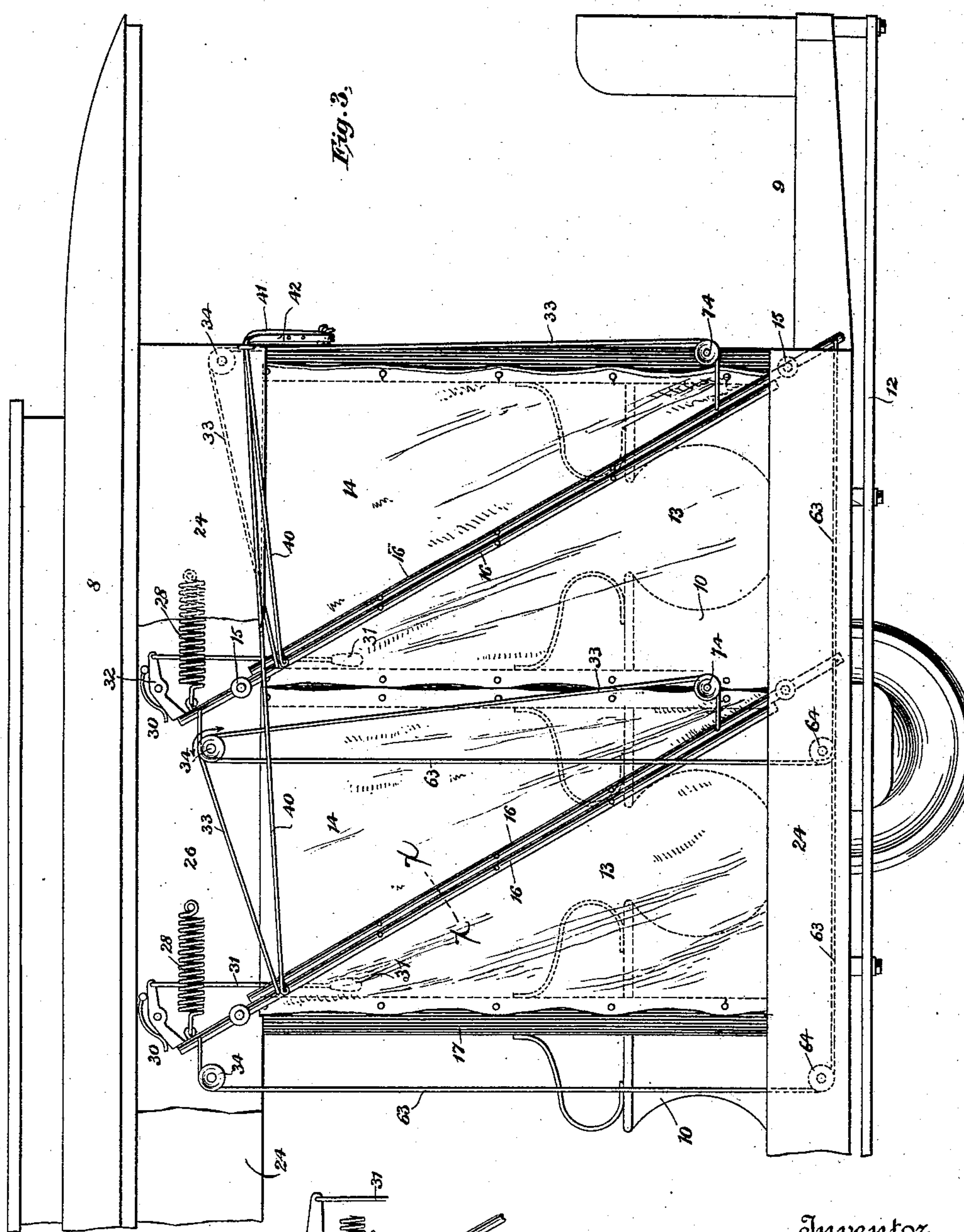


Fig. 3.

Witnesses

Geo. W. Dreck.
Edward Thorpe.

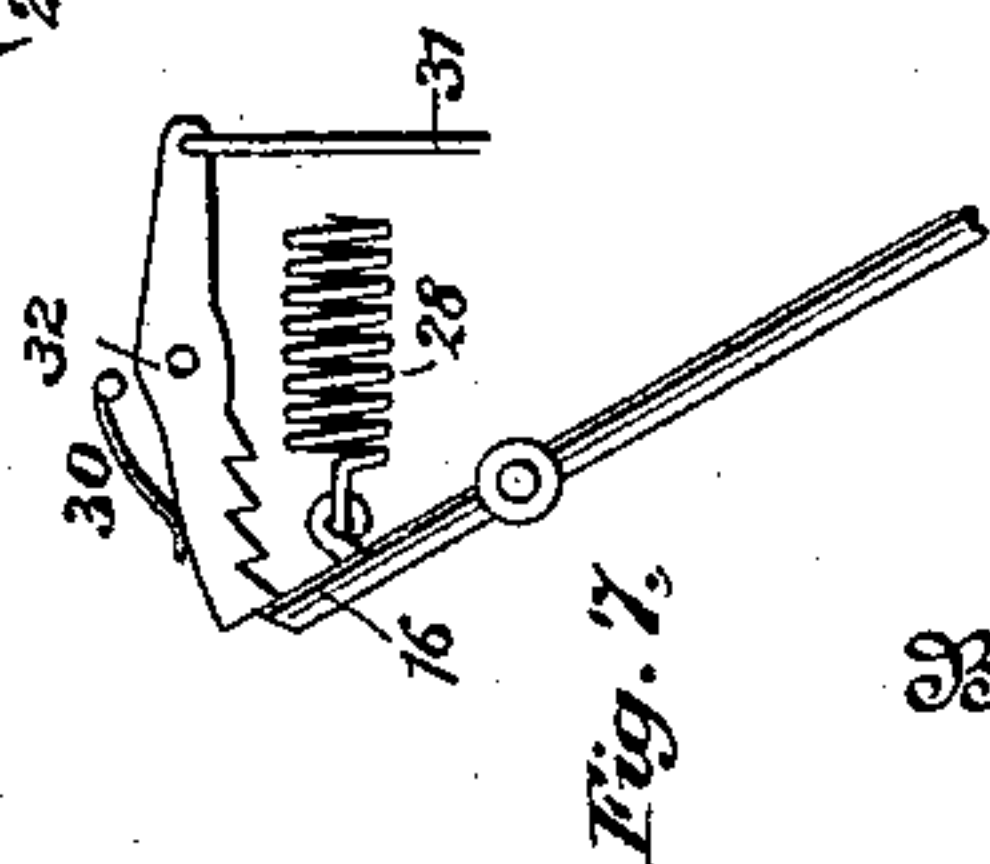


Fig. 7.

Inventor

Frank Mansfield.
By his Attorneys
Fowler & Fowler.

UNITED STATES PATENT OFFICE.

FRANK MANSFIELD, OF NEW YORK, N. Y.

STREET-CAR DOOR.

SPECIFICATION forming part of Letters Patent No. 472,737, dated April 12, 1892.

Application filed July 12, 1890. Serial No. 358,518. (No model.)

To all whom it may concern:

Be it known that I, FRANK MANSFIELD, a citizen of the United States, residing at New York, county and State of New York, have
5 invented certain new and useful Improvements in Street-Car Doors, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the
10 same, reference being had to the drawings forming part of this specification.

My invention relates to a door for street or tram cars, and is especially adapted for a street-car of the type known as an "open"
15 or "summer" car, which is provided with transversely-arranged seats, to which access may be had from doorways along the sides of the car.

The invention consists, essentially, in a door
20 comprising two collapsible sections, each adapted to close a part of the doorway and moving in the plane thereof on centers located at or near diagonal corners of the doorway.

25 The invention further consists in the novel and peculiar arrangements and combinations of the several parts of the apparatus, all as hereinafter fully described, and then pointed out in the claims.

30 In the accompanying drawings, illustrating an embodiment of my invention, Figure 1 is a side view of a portion of an ordinary form of a summer street-car with my improvements applied thereto. Fig. 2 is a detached broad
35 side view of one of the triangular collapsible sections of the door. Fig. 3 is an enlarged side view of part of a car provided with my improvements. Fig. 4 is a sectional view taken on a plane indicated by line 4 4 in Fig.
40 1. Figs. 5 and 6 are transverse sectional views of the poles of the door-sections, the plane upon which the section is taken being indicated by line *x x*, Fig. 3. Fig. 7 is a detail view of a modified form of lock for the
45 door-sections. Fig. 8 is a side view of Fig. 6 and shows portions of the poles of the door-sections, with the latch for holding them together.

50 In the said drawings like numbers of reference designate like and corresponding parts throughout.

Referring to the drawings, 8 designates an

ordinary form of a summer street-car having an end platform 9 and transversely-arranged seats 10, with side doorways 11 at the ends of
55 such seats, and having the usual side step 12 extending the length of the car.

My improved door consists in two sections 13 and 14, formed, preferably, triangular and made of suitable flexible material, such as
60 canvas. These sections are arranged to move in the plane of the doorway 11 upon centers 15, located at diagonally-opposite points of the doorway, so that each door-section 13 14
65 may close a triangular half of the opening or doorway. The meeting edge of each door-section 13 14 is provided with a rigid pole or rod 16, to which the diagonal edge of the flexible material of the section is secured in
70 a suitable manner, while the vertical edge thereof is made fast to a post or jamb 17. This construction is, in effect, like a fan which opens and closes on the center 15, one
75 of the fan-like constructions closing over the lower diagonal half of the doorway and the other over the upper diagonal half thereof. Each door-section is provided with a handle 18, which may be used in drawing them together
80 to close the door or in pushing them apart to open it. The flexible collapsible sections 13 and 14 may be provided with stiff ribs 19, which are hinged to the pole 16 at 20. (Shown in Fig. 2.) The ribs serve to strengthen the
85 sections and prevent them from bulging excessively. If preferred, these collapsible sections may be made of flexibly-connected panels or strips after the manner of some kind of fans, in which case, as in the present, the
90 sections would fold against the vertical posts 17, so as to occupy a very compact space and be out of the way. Of course the sections may be so arranged as to meet, when closed, on the other diagonal of the doorway than the one shown; but this is a matter of preference. When in opening the door the sections
95 are simultaneously moved so that a person may easily pass through the doorway after the sections have been removed over about two-thirds of their sweep or range of movement, for when they have completed this
100 much of their movement the pole 16 of the lower section 13 will be about on a line drawn between its center of motion 15 and a point 21 and the pole 16 of the section 14 will be on

a line through its center of movement and a point 22, thereby making an opening amply large for any one to pass through, the width of such opening being, in fact, wider than the space between the seats. A suitable recess or pocket 25, formed between the side-board 24 and a portion 26 of the car, may be provided for the ends of the door-sections to move in.

In order to prevent the door-sections from moving of their own accord and to permit of their being placed in any adjustment, I employ a friction device, which may be located upon the end of the door-section. In the present construction the friction device consists in a spring 27, which is secured upon the end of the pole 16 and bears against the pieces 24 and 26, which act as guideways for steadying the end of the section. (See Fig. 4.) If preferred, the friction device may be applied to the axle upon which the section turns.

The operation of each door-section is facilitated by a spring 28, which may be arranged to either open or close the sections. In the construction shown the springs serve to open the sections when the same are unlocked or free to move, the springs being preferably connected by one end to fixed points on the car and by the other end to an extension of the pole 16 beyond its pivotal point 15. There are of course many ways in which a spring may be so applied to the sections as to move them.

The sections are provided with a lock for holding them against the action of the springs, and the lock is under control of a passenger on the car, so that when the sections are closed and locked together the lock upon being released by a passenger will allow the springs to quickly open the sections.

In Fig. 6 the latch 52 is shown as being applied to about the center of length of the poles 16 of the sections, while in Fig. 3 the lock is applied to the extended end of the pole 16, and since in the latter instance it is at such a high elevation it is provided with a depending handle 31, which extends to a point within convenient reach of a passenger. The lock is a spring or self-acting one and therefore automatically locks the sections in closed position, so that upon the sections being fully closed they will be automatically locked and kept under spring-tension, the spring serving to open them when the lock is released. In Fig. 3 the pivoted latch 32 of the lock engages the free end of the pole 16, which, when the right-hand end of the latch is lowered, escapes the left-hand end thereof to allow the sections to open. In closing the sections the end of the pole trips the left-hand end of the latch 32, and passing under the same into the position shown, the latch tripping into such position, locks the pole.

In the construction shown in Fig. 3 the door-sections 13 and 14 are so connected by means of suitable cords and pulleys that they may be operated together. This simultaneous operation is effected by means of the following

construction: A cord 33 is connected at a point just below the center of movement 15 of the lower door-section 13, and is passed thence over a stationary pulley 34 above the doorway to and about a second stationary pulley 74 at the lower right-hand part of the doorway, whence it passes to the pole 16 of the upper door-section 14, where it is connected at a point above the center of movement 15 of the upper section. A second connecting-cord 63 passes from a point on the pole 16 of the lower door-section 13 above its center of movement 15, over a pulley 34 above the doorway, and thence to and about a stationary pulley 64 to a point on the pole 16 of the upper door-section 14 below its center of movement 15. Each pair of door-sections is provided with the cords and pulleys just described, and in addition the lower section 13 of each door is provided with a pull-cord 40, which leads from a point on the pole 16 thereof below its center of movement 15 through an eye at the end of the car, where it is provided with a loop for receiving a hook, by means of which the doors may be held in closed position. The door-sections may be operated in pairs through means of the intermediate cords, or they may be so connected with intermediate mechanism that the upper sections may be operated together and the lower sections operated also together.

In Fig. 1 I show an arrangement of pull-cords and connecting-cords by which the lower sections and the upper sections may each be operated in sets by a person standing upon the end platform of the car. In this construction the upper sections are connected together by cords 55, the end section being connected by a link 36 to a bell-crank lever 37, which is controlled by a hand-rod 38, located near the dash-board at the end of the platform. This hand-rod is provided with a stop or lock 39 for locking it, so as to hold all the sections closed in the positions shown. The lower sections are connected in a similar way by means of the cords 35, and a pull-cord 40 extends from the end section through an eye 41 to the end of the car, where it is looped, and a hook 42 receives this loop when the pull-cord 40 is drawn upon so as to close the lower sections, the loop and hook acting as a lock to hold the lower sections against the action of their springs 28 in the same manner as the stop 39 holds the upper sections against the action of the connected springs 28. The upper sections are simultaneously moved in closed position by drawing upwardly the rod 38 and locking it by means of the device 39, and the lower sections are simultaneously drawn into closed position and locked by pulling upon the cord 40 and placing the loop at the end thereof over the hook 42, as clearly illustrated in Fig. 1 of the drawings.

In Fig. 7 is shown a modification of the latch 32 of the lock. This latch is formed with a series of teeth or stops like a rack, by means of which the pole 16 of section 13 may

be held in any one of several adjustments in an obvious manner, so that the door can be held partially open.

In Fig. 3 the door-sections 13 are shown as being operated in pairs by means of pull-cords 40, which extend one from each lower section to the end of the car, where they are passed through eyes 41, and each provided at the end with a loop having a hook 42 for fastening the cord when the sections are closed. As each section 13 is provided with one of these cords 40, they may be individually controlled by the conductor from the end platform of the car. Since the lock 30 holds the sections in closed position, it will not be necessary to loop the cord over the hook 42 after the sections are closed, as it is desired to leave the sections under the control of the springs 28 and locks 30 when they are closed, in order that a passenger may be able to readily open the door through which he may desire to pass.

The meeting edges of the door-sections lie a considerable distance apart when closed and are provided with a soft flap 43, preferably made of rubber, though any soft material will do, which, when the sections are closed, are compressed so as to form a good seal. The use of this flap will prevent garments from being caught between the closing door-sections and held thereby. These flaps 43 may be mounted upon the edge of the sections in any suitable way, two different ways being shown in Figs. 5 and 6, respectively. In the construction shown in Fig. 5 the flap 43 of flexible material has its long edges secured to the sides of the pole 16 by means of tacks or suitable fasteners, as is clearly shown in said figure. In Fig. 6 the two long edges of the flap 43 are brought together and set in a groove extending along the meeting face of the pole 16, and are secured therein by pins, as shown in the drawings.

As the lower part of the side of a street-car is usually curved inwardly toward the base of the car, it may be desirable to curve or bow the poles 16 laterally near their lower ends, in order to have them conform to the curvature of the side of the car.

Having thus described my improvements in street-car doors, what I claim as my invention, and desire to secure by Letters Patent, is—

1. A car-door comprising two sections hinged or pivoted at points at or near diagonally-opposite corners of the doorway, whereby the sections may meet on an inclined line when closed, for the purpose set forth.

2. A car-door comprising two spring-acted sections pivoted at points at or near diagonally-opposite corners of the doorway and having their meeting edges closing on an inclined line, for the purpose set forth.

3. A car-door comprising two collapsible sections mounted one at each side of the doorway and each closing a triangular half thereof, for the purpose set forth.

4. A car-door comprising two triangular collapsible sections pivoted in the plane of the

doorway, having their centers of motion located at points diagonally opposite relative to the doorway, each section closing a triangular half of the doorway, for the purpose set forth.

5. A car-door comprising two collapsible triangular sections made of flexible material and each provided at its meeting edge with a rigid pole hinged or pivoted near one corner of the doorway, the vertical edge of each section being secured to a side of the doorway, whereby each section may close a triangular half of the doorway.

6. A car-door comprising two collapsible sections moving on centers in the plane of the doorway located at points at or near diagonally-opposite corners thereof and provided with friction devices, for the purpose set forth.

7. A car-door comprising two collapsible triangular sections 13 and 14, each moving on a center 15 at diagonally-opposite corners and adapted to close each a triangular half of the doorway, substantially as and for the purpose set forth.

8. A car-door comprising two collapsible triangular sections 13 and 14, moving on centers 15 at diagonally-opposite corners and in the plane of the doorway and provided each with a spring 28, and a lock, such as 30, for holding the sections together when closed, said lock being under the control of a passenger, substantially as described.

9. A car-door comprising two collapsible triangular sections 13 and 14, moving on centers 15 at diagonally-opposite corners and in the plane of the doorway and provided with friction devices, such as 27, for holding the sections in adjustment, substantially as and for the purpose described.

10. A car-door comprising two collapsible spring-acted triangular sections 13 and 14, moving on centers 15 at diagonally-opposite corners and in the plane of the doorway, and a lock for holding the sections together, said sections provided with intermediate connections, such as cords 33, provided with guide-pulleys 34, whereby the sections may be operated together, substantially as and for the purpose described.

11. A car-door comprising two collapsible spring-acted triangular sections 13 and 14, moving on centers 15 at diagonally-opposite corners and in the plane of the doorway, connections intermediate the sections for simultaneously operating them, and a pull connection 40, extending from one of them to the end of the car, substantially as and for the purpose set forth.

12. The combination, with a set of car-doors comprising each two spring-acted collapsible triangular sections 13 and 14, moving on centers 15 at diagonally-opposite corners and in the plane of the doorway, of cords or links 35, connecting the upper section of one door with the upper section of the next door, also the lower section of one door with the lower section of the next, and so on, a pull-cord 40, ex-

tending from the lower section of the end door of the set to the end of the car, and a pull cord or connection extending from the upper section of the end doorway of the set to the
5 end of the car, substantially as and for the purpose set forth.

13. A door comprising two triangular sections hinged or pivoted at points at or near diagonally-opposite corners of the doorway,
10 whereby one of said sections tends to swing or gravitate into open position, and connec-

tions intermediate the two said sections, whereby they are balanced, for the purpose set forth.

In testimony whereof I have hereunto set 15 my hand and seal this 14th day of May, 1890, in the presence of the two subscribing witnesses.

FRANK MANSFIELD. [L. S.]

Witnesses:

CHAS. D. FOWLER,
WILLIS FOWLER.