L. T. JOHNSON.

CAR DOOR.

APPLICATION FILED DEC. 16, 1914.

1,145,197.

Patented July 6, 1915.

2 SHEETS—SHEET 1.

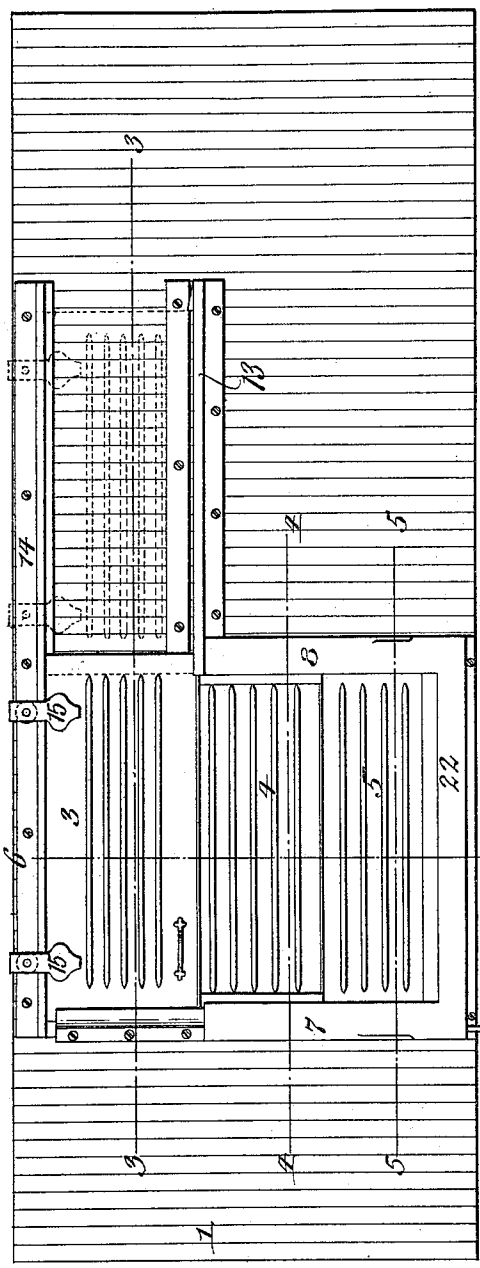


Fig. 1.

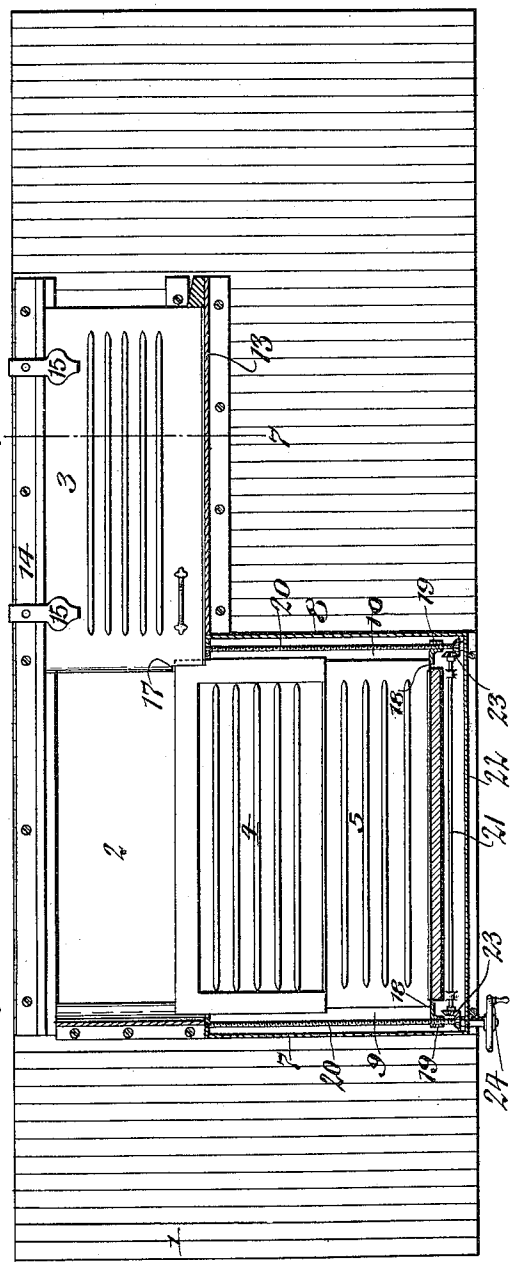


Fig. 2.

WITNESSES.

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2 SHEETS—SHEET 2.

Fig. 3.

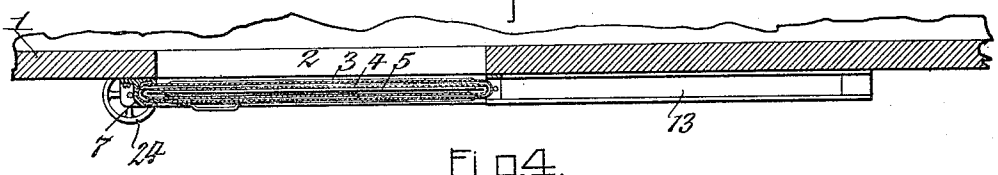


Fig. 4.

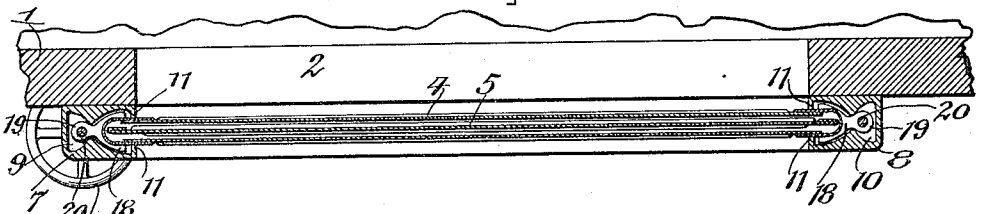


Fig. 5.

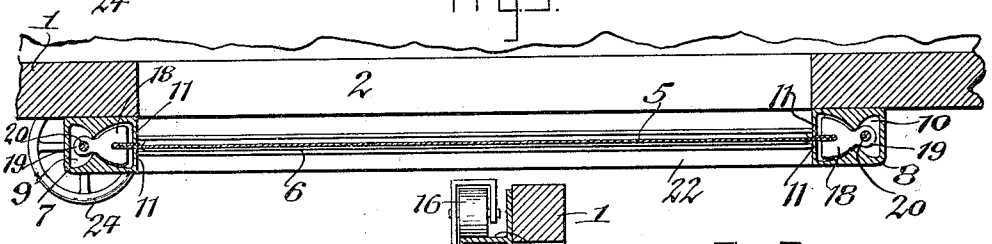


Fig. 6.

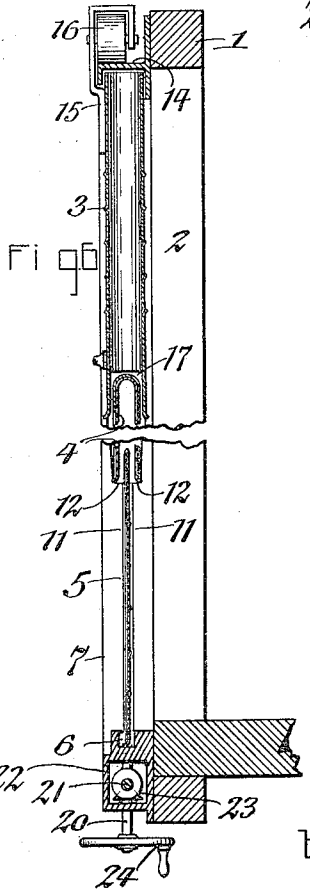


Fig. 7.

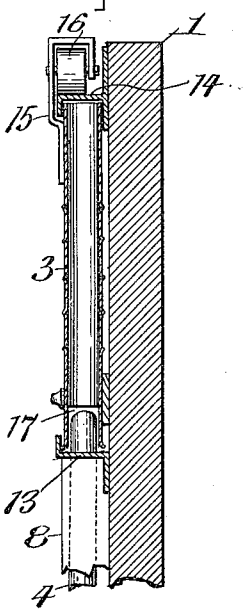


Fig. 8.

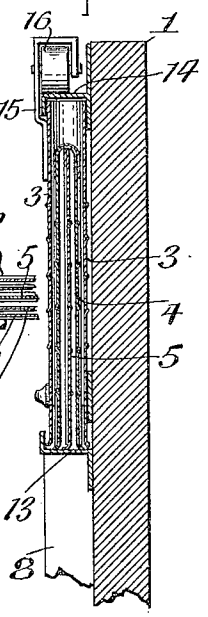
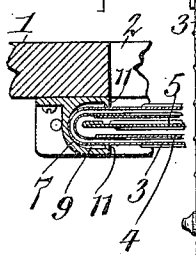


Fig. 9.



WITNESSES.

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LAWRENCE T. JOHNSON, OF BUFFALO, NEW YORK.

CAR-DOOR.

1,145,197. Specification of Letters Patent. Patented July 6, 1915.

Application filed December 16, 1914. Serial No. 877,519.

To all whom it may concern:

Be it known that I, LAWRENCE T. JOHNSON, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Car-Doors, of which the following is a specification.

This invention relates to a car door which is more particularly adapted to close the doorway of a car so that the same may be used either for transporting grain or miscellaneous freight.

It is the object of this invention to provide a car door of this character which can be readily used for loading, unloading and transporting grain as well as miscellaneous freight, which is very strong and durable in construction and which can be easily opened and closed.

In the accompanying drawings: Figure 1 is a side elevation of a car equipped with my improved door showing the latter in its fully closed position. Fig. 2 is a similar view, partly in section, and showing the uppermost section of the door moved horizontally to one side of the doorway while the remaining sections of the door below the uppermost one are in their operative position across the lower part of the doorway. Fig. 3 is a horizontal section, in line 3—3, Fig. 1, but showing the intermediate and lower sections of the door slid upwardly into or past the uppermost section of the door. Fig. 4 is a horizontal section, on an enlarged scale, taken in line 4—4, Fig. 1, and showing the lower section of the door slid upwardly into or past the intermediate section. Fig. 5 is a horizontal section, on an enlarged scale, taken in line 5—5, Fig. 1. Fig. 6 is a fragmentary vertical section, on an enlarged scale, taken in line 6—6, Fig. 1. Fig. 7 is a fragmentary vertical section, on an enlarged scale, taken in line 7—7, Fig. 2. Fig. 8 is a fragmentary vertical section similar to Fig. 7 but showing the upper intermediate and lower door sections slid past each other and along the horizontal guideways on one side of the doorway. Fig. 9 is a fragmentary horizontal section, on an enlarged scale, of the guideway for the door at the left hand side of the doorway similar to that shown in Fig. 3.

Similar characters of reference indicate corresponding parts throughout the several views.

1 represents an upright side wall of a car which is provided with a doorway 2 which is adapted to be controlled by my improved door or closure. In its general organization my improvements comprise a door composed of a plurality of sections which are adapted to be slid past each other or folded in a vertical direction in suitable guideways on the wall of the car, and the uppermost section is capable of being moved laterally toward one side of the doorway along horizontal guideways independently of those sections of the door below the uppermost section, and the lower sections of the door are also capable of being assembled with the uppermost section by sliding the lower door sections upwardly past the upper section and then moving the same in unison with the latter to one side of the doorway and along the horizontal guideways.

In the preferred construction of the door the same preferably comprises an upper section 3, an intermediate section 4, and a lower section 5 which when separated are arranged one above the other across the doorway to form a complete closure for the door opening, as shown in Fig. 1. The uppermost door section is preferably made hollow, as shown in Figs. 1, 7–9, and its lower end is open so that the upper end of the intermediate section can project into the lower part of the upper section and form a joint therewith, as shown in Fig. 6. The intermediate section is also made hollow and is open at its lower end so that in the normal closed position of the door the lower section thereof can project with its upper end into the lower part of the intermediate section, as shown in Fig. 6. The lowermost door section is preferably composed of a single ply, as shown in the last mentioned figure, although the same may be otherwise constructed, if desired. In the normal position of the several sections of the door in which the same completely close the door opening the lower door section engages its lower end with a horizontal upwardly opening channel 6 which is secured lengthwise of the sill of the door which channel may also support this lower door section in its lowermost position.

Extending upwardly along opposite sides of the doorway or passage are two guideways or posts 7, 8 which are provided with vertical channels 9, 10 opening toward each other. At the outer end of each of these vertical channels the same is provided with two guide ribs 11, 11 which face each other and which serve to produce a contraction of

the channel at the outer end thereof while the inner part thereof is enlarged. The vertical guideway 9 at the left hand side of the doorway extends from the lower end of the same to the top thereof so that the same serves as a vertical guide for the respective left hand edges of the upper, lower and intermediate sections of the door. The vertical guideway 10 at the right hand side of the doorway, however, extends downwardly to the lower end of the doorway but its upper end terminates short of the top of the doorway and preferably at a point adjacent to the joint between the upper and intermediate door sections, as shown in Fig. 2. The space between the guide ribs of the guideways which are arranged on the lower parts thereof and receive the lower door section is comparatively narrow so as to form a comparatively tight joint with the lower door section. The space between the guide ribs on those parts of the posts about midway of their height are arranged farther apart so as to accommodate the increased thickness of the intermediate door section which is received between these portions of the guide ribs, as shown in Figs. 4 and 6. The space between the guide ribs at the upper end of the left post is still wider so as to be capable of receiving between them the uppermost section of the door which has the greatest thickness compared with the other door sections, as shown in Figs. 3, 6 and 9. The intermediate door section in its normal lowered position rests with its lower edge on shoulders 12, 12 formed between the narrowest lower part of the vertical guideways and the next higher wider part of the same, as shown in Fig. 6.

Extending laterally and horizontally from that side of the doorway on which the short vertical guideway 10 is arranged and in line with the upper end of this short guideway is a horizontal lower guideway 13 which is secured to the adjacent part of the car wall, as shown in Figs. 1, 2, 3, 7 and 8. An upper horizontal guideway 14 extends across the upper end of the doorway and also laterally therefrom on the same side on which the lower horizontal guideway is arranged. On this upper horizontal guideway is supported the upper door section, this being preferably accomplished by means of a plurality of hangers 15 secured to the upper end of the upper door section and having rollers 16 which engage with the upper side of the upper horizontal guideway so that this door section may be moved along this guideway either to one side of the doorway or across the upper part of the same, during which time the upper guideway serves as a rail or track for the hangers of this door section. While the upper end of the upper door section thus slides along the upper horizontal guideway its lower end or edge may, if desired, also slide or move along the lower horizontal guideway but this is not necessary. In order to permit the upper door section to thus slide along the upper and lower horizontal guideways independently of the intermediate and lower sections this upper door section when made hollow, as shown in the drawings, is provided at its left vertical edge near the lower end thereof with a downwardly opening notch or slot 17 which is at least as high as the upper part of the intermediate door section projecting into the lower end of the upper door section. By this means the upper door section when moved horizontally to one side of the doorway is permitted to clear the intermediate door section by reason of the notch 17 forming a passage or clearance space which receives the upper edge portion of the intermediate door section, as shown in Fig. 2.

When the upper door section is in its normal closed position across the doorway the intermediate door section may be raised into or slid past the upper door section and the lower door section may also be slid into or past the intermediate door section, so that the several door sections are telescoped, folded or collapsed into compact form equal in height to the uppermost door section. After the several door sections are thus applied the same may be moved in unison to one side of the doorway and along the horizontal guideways so that the entire doorway is uncovered. If desired, only the lowermost section of the door may be raised leaving the upper and intermediate sections in their closed position across the doorway. When only the upper door section is moved to one side of the doorway the car is in condition to be filled with grain or other loose freight which is to be transported, and by opening only the lower door section more or less of the grain or similar material may be discharged from the car whenever desired. When, however, all the door sections are gathered and moved to one side of the doorway the interior of the car may then be loaded and also unloaded with miscellaneous freight such as is usually packed in crates or containers or taken care of in any other desired way.

The raising and lowering of the intermediate and lower sections of the door may be effected by various means but those which are shown in the drawings are suitable and comprise two vertically movable shifting arms 18 arranged in the channels of the vertical guideways and adapted to engage with the lower edges of the lower and intermediate door sections. These shifting arms are arranged on screw nuts 19 which receive upright screw shafts 20 arranged in the vertical guide channels and journaled at their upper and lower ends in suitable bearings therein, so that these shafts can turn but are held against vertical motion. These screw

shafts may be caused to turn in unison in a variety of ways, for instance, as shown in the drawings, by means of a horizontal operating shaft 21 journaled in bearings arranged within the casing 22 which receives this shaft and operatively connected at its opposite ends by means of intermeshing bevel gear wheels 23 with the screw shafts, as shown in Figs. 2 and 6. These shafts may be turned either manually or otherwise but preferably by means of a handle, hand wheel or crank 24 applied to the lower end of one of the screw shafts, as shown in Figs. 1–6. This lifting mechanism is so constructed that upon turning the handle 24 in one direction or the other the shifting arms will be raised or lowered in unison. In the normal or lowermost position of the lower door section the shifting arms only engage with the lower edges of this door section, as shown in Fig. 2. As the shifting arms are raised the same lift the lower door section independently of the intermediate section until these arms engage the lower edge of the latter after which the same is also lifted with the lower section during the continued upward movement of the shifting arms. The shifting arms continue their movement in this direction until the same are flush with the lower horizontal guideway at which time both the lower and intermediate door sections have been fully moved upwardly past one another and into the upper door section so that these several door sections may now be moved in unison from the doorway to one side thereof and along the upper and lower horizontal guideways. During such lateral movement the lower and intermediate door sections are supported solely at their lower edges on the lower horizontal guideway and the shifting arms which at this time form a part of this lower horizontal guideway, while the upper door section is preferably supported only on the upper horizontal guideway independently of the lower and intermediate door sections. By this means the wear upon the upper and lower horizontal guideways is distributed and the opening and closing of these door sections may be effected more easily.

By construction of the upright guide channels so that the outer part of each of these is contracted while its inner part is enlarged the door sections arranged with their vertical edge portions in these channels are only engaged by the surface of the contracted parts of these channels and are spaced apart or separated from the surface of the inner enlarged parts of the same, thereby preventing the door sections from binding or becoming cramped in the channels of the door sections when sprung out of place slightly by the pressure of freight or grain against the same or from other causes. If the vertical edge portions of the door sections were permitted to engage over a considerable area of the inner surfaces of the channels the frictional contact with the same in the event of the door sections being sprung out of place would be considerable and would render the opening and closing of the door section very difficult, if not impossible, by manual means.

As a whole my improved door is very compact and durable in construction, the same is not liable to get out of order by rough usage and the same can be easily operated for opening and closing the doorway.

I claim as my invention:

1. A car having a wall provided with a doorway, upright guideways arranged on opposite sides of said doorway, horizontal guideways extending laterally from the upper part of said doorway, and a door comprising two door sections normally arranged one above the other, the upper section being hollow and having its lower end open and provided with a notch in the lower end of that vertical edge thereof which is normally opposite that side of the doorway toward which the upper section moves when uncovering the doorway, and the lower section projecting normally with its upper end into the lower end of the upper section, and said upper section being movable laterally along said horizontal guideways independently of said lower section and adapted to pass with said notch over said lower section during such independent movement.

2. A car having a wall provided with a doorway, upright guideways arranged on opposite sides of said doorway, horizontal guideways extending laterally from the upper part of said doorway and arranged one above the other, a door comprising upper, intermediate and lower sections normally arranged in a vertical row across the doorway, said upper door section being movable laterally out of said doorway and along said horizontal guideways either with said intermediate and lower door sections or independently thereof, and means for sliding the intermediate and lower door sections past each other and past the upper door section comprising shifting arms adapted to engage with the lower ends of the lower and intermediate door sections and to be raised flush with the lower horizontal guideway, and means for operating said lifting arms.

Witness my hand this 12th day of December, 1914.

LAWRENCE T. JOHNSON.

Witnesses:
THEO. L. POPP,
ANNA HEIGIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."