No. 734,155. PATENTED JULY 21, 1903.

G. I. BARNES & F. E. WOODFORD.

CAR DOOR.

APPLICATION FILED FEB. 13, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

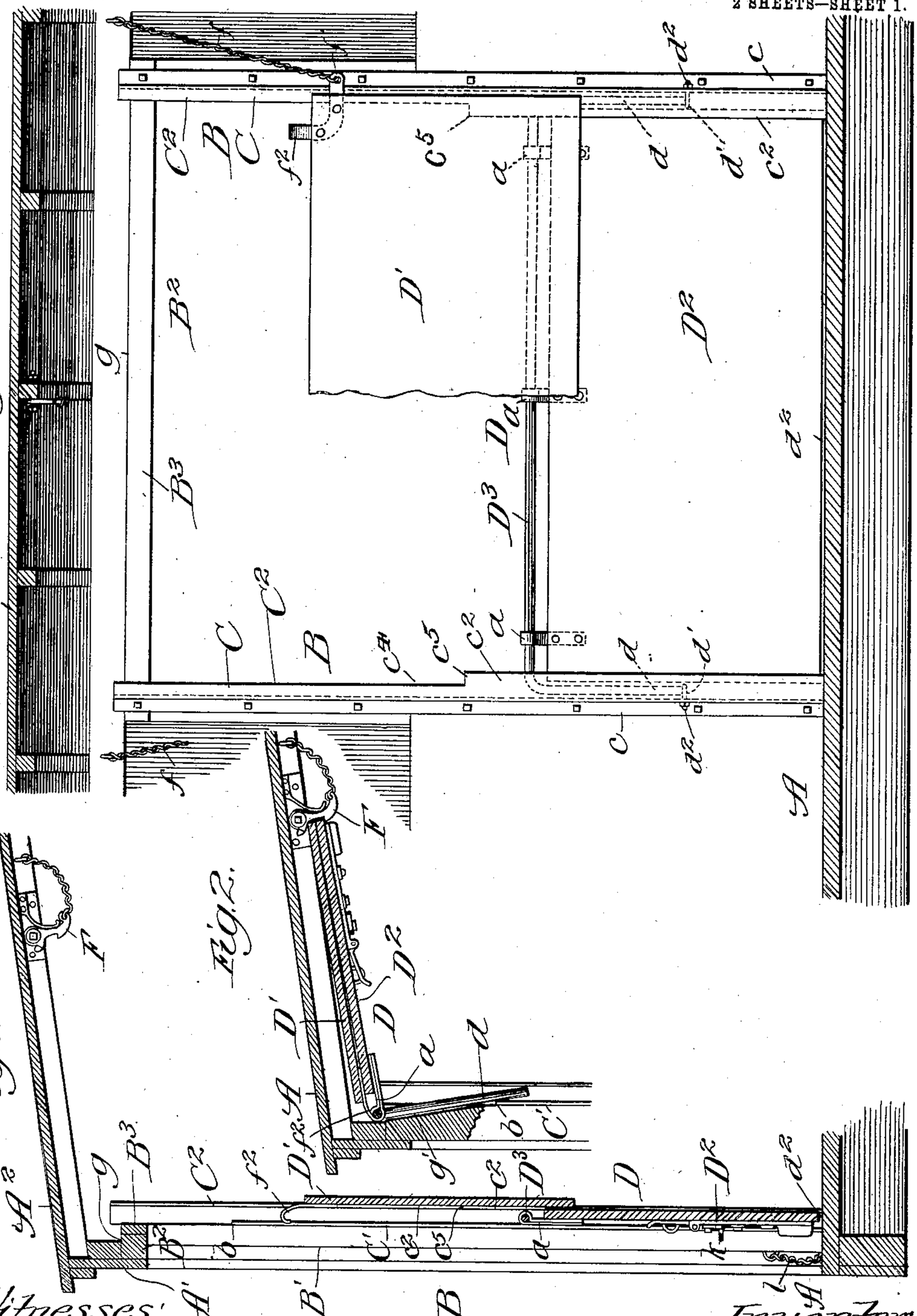

FIG. 3.

FIG. 2.

FIG. 1.

Witnesses:
Chas. E. Gaylord.
Geo. C. Davies

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NO MODEL. 2 SHEETS—SHEET 2.

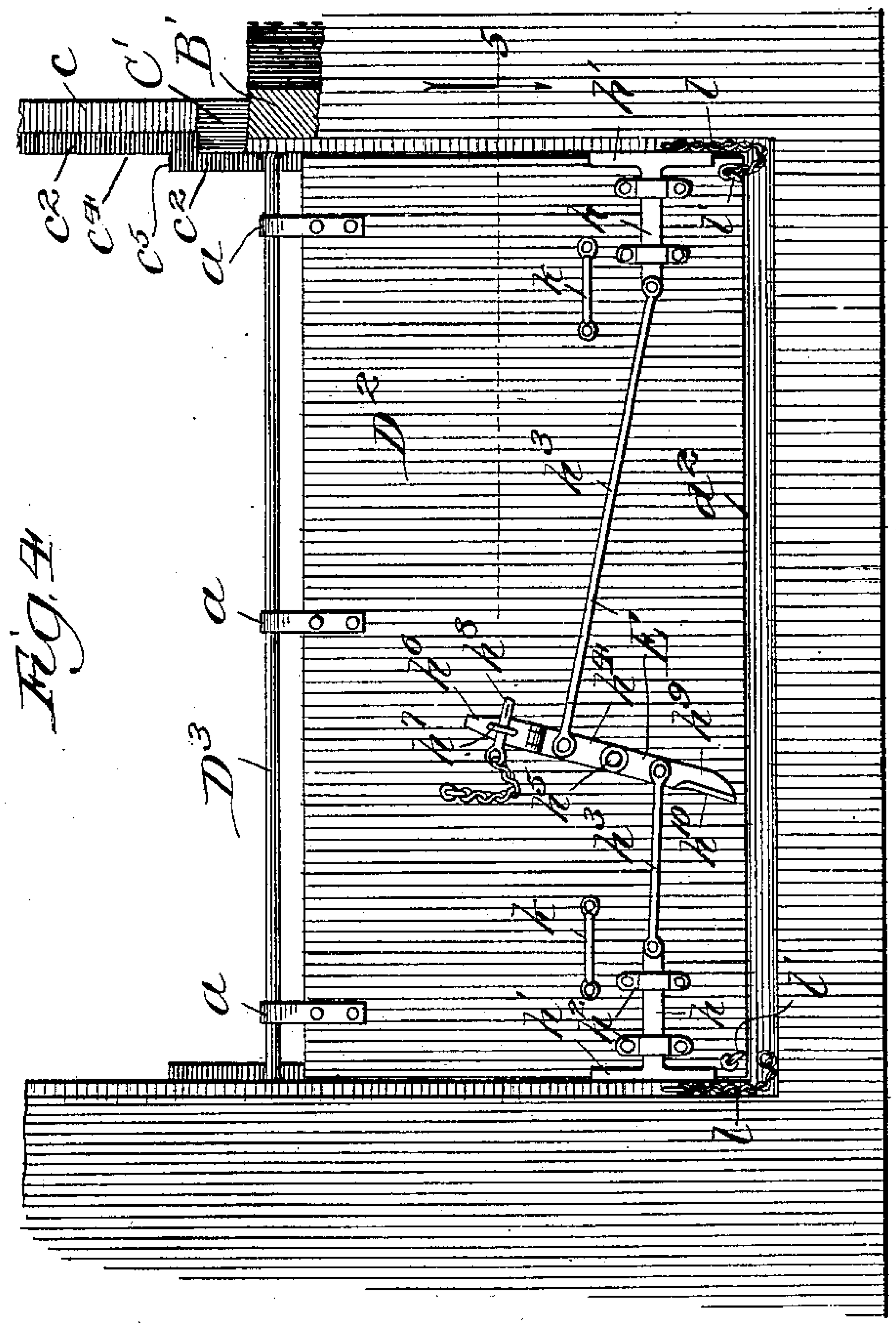

Fig. 4.

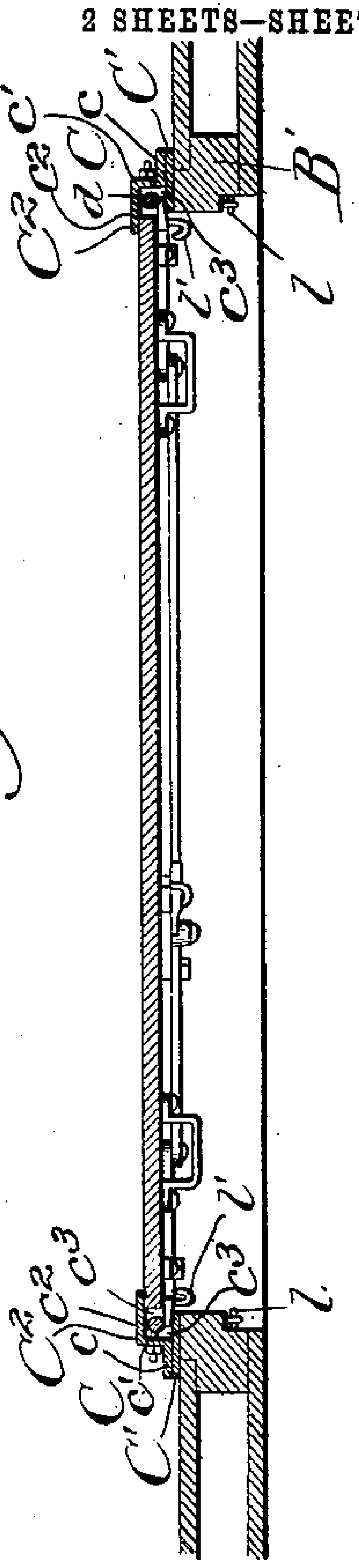

Fig. 5.

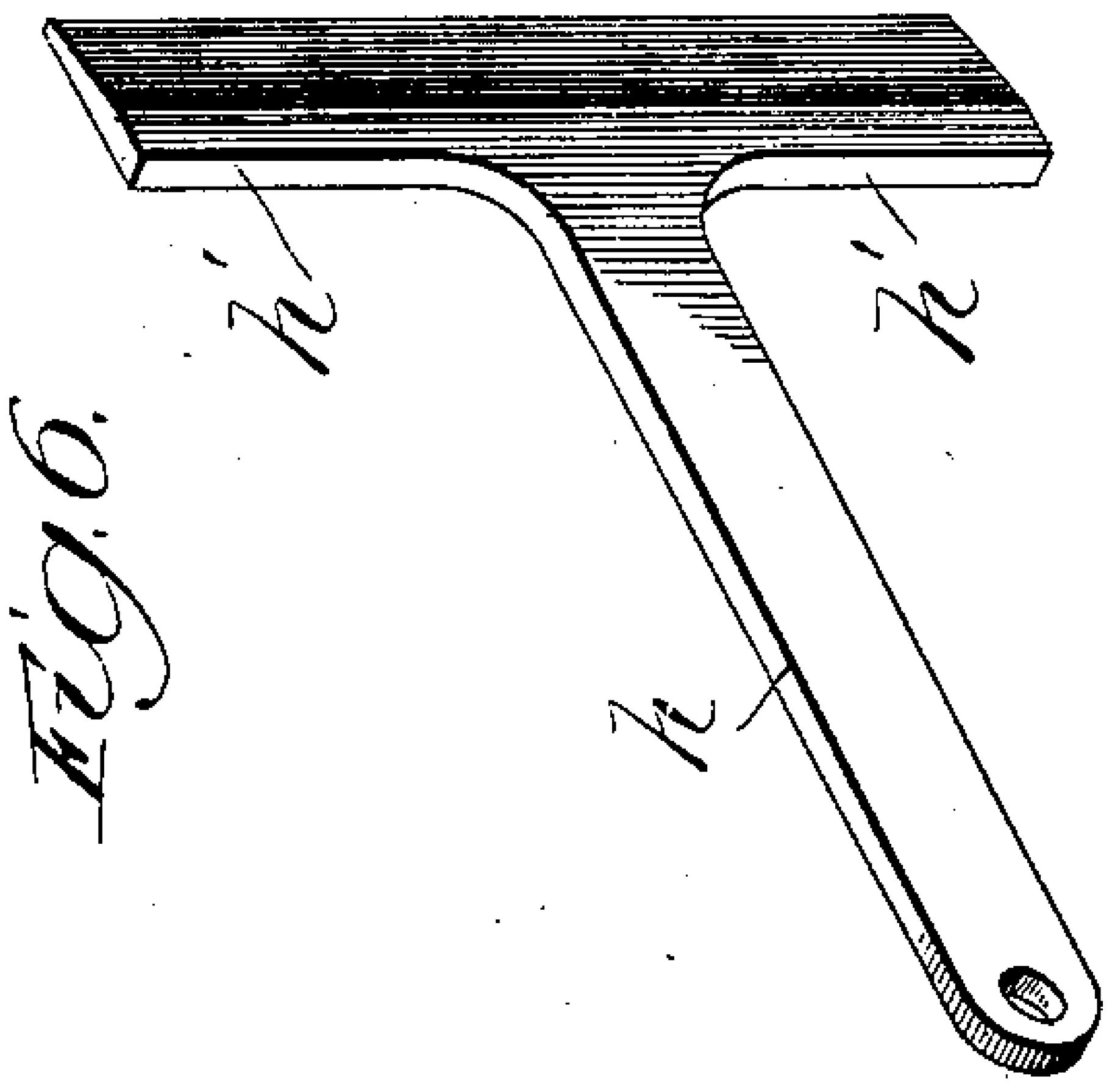

Fig. 6.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 734,155. Patented July 21, 1903.

UNITED STATES PATENT OFFICE.

GEORGE I. BARNES AND FRANK E. WOODFORD, OF CHICAGO, ILLINOIS, ASSIGNORS OF ONE-THIRD TO HERMANN MUELLER, OF CHICAGO, ILLINOIS.

CAR-DOOR.

SPECIFICATION forming part of Letters Patent No. 734,155, dated July 21, 1903.

Application filed February 13, 1903. Serial No. 143,168. (No model.)

To all whom it may concern:

Be it known that we, GEORGE I. BARNES and FRANK E. WOODFORD, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Car-Doors, of which the following is a specification.

Our invention relates particularly to the doors of cars used for conveying grain or other similar products in bulk.

Our primary object is to provide a door for cars of this character which may be opened readily from the outside of the car, which is of exceedingly simple and cheap construction, and which will maintain close joints in use and yet may be opened with ease.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 represents a broken transverse section of a car equipped with our improved door, showing the door in the closed position; Fig. 2, a similar view showing the door raised and secured beneath the roof of the car; Fig. 3, a broken longitudinal vertical section of the car looking at the inner side of the door and showing one-half of the upper section of the door removed; Fig. 4, an outer view of the lower portion of the door; Fig. 5, a horizontal section taken as indicated at line 5 of Fig. 4; and Fig. 6, a perspective view of a bolt or plunger employed.

A description of the preferred construction is as follows:

A represents a portion of a car-body having a side A′ and a roof A^2; B, a door-frame having posts or jambs B′ and a top member B^2; C, guides connected with the inner surface of the posts B′ and comprising metallic plates or strips C′ and **Z**-bars C^2; D, a door comprising upper and lower sections D′ D^2, respectively; D^3, a slide which is capable of vertical movement in the guides C and has attached thereto by pivotal hinges or straps *a* the lower door-section D^2; E, means attached to the outer side of the door-section D^2 for securing the latter in its closed position, and F a spring-held latch which serves to secure the free lower edges of the door-sections when the latter are swung to the position indicated in Fig. 2.

The plates C′ lie in contact with the inner faces of the posts B′, and their edges are flush with the adjacent surface of said posts. They terminate at points *b* some distance below the top of the door. The **Z**-bars have flanges *c*, turned away from each other and lying in contact with the inner surfaces of the plates C′, web portions *c*′ at right angles to the flanges *c*, and flanges c^2, turned toward each other. This construction provides vertical grooves or ways c^3 for the lower door-section. The flanges c^2 have their edge margins cut away, as indicated at c^4, above the shoulders c^5. The member D^3 is preferably formed from gas-pipe having downturned ends *d*, which move in the ways c^3. This pipe is shown of a diameter considerably less than the width of the grooves c^3 for clearness of illustration only. In practice the downturned ends of the pipe fit with reasonable closeness in the grooves, but little play being necessary to permit the parts to assume the position shown in Fig. 2. The lower extremities of the downturned ends *d* rest upon stops *d*′, which may comprise headless bolts extending through the webs of the **Z**-bars and projecting into the grooves c^3. These stops are so located that the lower door-section will be suspended freely from the rod D^3 and have its lower edge separated by a slight space d^2 from the car-floor. The door-section D′ bears upon the inner surface of the flange c^2, as shown in Fig. 1, and is preferably suspended by chains *f*, attached to the car-frame near the top of the car, as shown in Fig. 3. The lower ends of the chains are attached to clips *f*′, connected with the upper corners of the door-section D′, said clips having bent portions affording outwardly-projecting hooks f^2. The hooks f^2 are located in the path of the door-section D^2, so that when the latter is elevated the hooks will engage the upper edge of said door-section. The construction of the door-frame is such as to afford an offset or shoulder *g* above the member B^2 and the attached member B^3, and the members B^2 B^3 and the door-posts as well are provided with grooves *g*′, which receive the upper portions of the pipe-sections *d* when the door is in the elevated position.

The device E comprises plungers or bolts *h*, having expanded ends *h*′, beveled on their

outer surfaces; guides h^2 for the shanks of the plungers; links h^3, connected with the adjacent ends of the plungers; a lever h^4, pivoted to the door-section D^2 at h^5 and having adjacent ends of the links h^3 pivotally connected with it on opposite sides of the pivot; a hasp h^6, connected with one end of the lever h^4; a staple h^7, and a bolt h^8. The lever h^4 has a projecting end h^9, equipped with a lug h^{10}. When the hasp is unfastened and thrown back, the lever may be tapped at the lug h^{10} with a hammer or sledge to unfasten the door. The heads h' of the plungers h have their outer surfaces beveled to afford wedges, which enter between the door-sections and the plates C', as illustrated in Fig. 5. The wedges are of considerable length vertically, so that the inner margins of the vertical edges of the door-sections will be forced firmly against the flanges c^2, thereby affording tight joints. The lower door-section is equipped on its outer surface with handles k. To the lower portion of the door-frame are attached chains l, and the door-section D^2 is provided at its lower corners with hooks l', over which the chains may be hooked at any link desired to permit the door-section to open to any desired degree at its lower edge.

The manner of use of the improved door will be readily understood. Preparatory to filling a car with grain the door is released from the position shown in Fig. 2 by operating the catch F and allowing the free edges of the door-sections to swing downwardly, the shaft D^3 at this time resting upon the offset g above the door-frame and serving to support the door-section D^2 and through the medium thereof and of the hooks f^2 the door-section D'. This permits the door-section D^2 to be swung into alinement with its grooves, being at this time above the shoulders c^5. By disengaging the shaft D^3 from the shoulder g, which is readily effected, the door is permitted to move downwardly, the section D^2 entering its guides and the section D' bearing against the inner surfaces of the flanges c^2. The chains f limit the downward movement of the section D', while the section D^2 can continue to move until the lower ends of the pipe-sections d engage the stops d'. The door is then secured in position by locking the device E, as shown in Fig. 4. When it is desired to open the door, the chains l are adjusted as desired, the hasp h^6 is removed from its staple, and the lever h^4 tapped at the lug h^{10} to withdraw the plungers h. When this is done, the pressure of the grain causes the lower door-section to swing outwardly about the shaft D^3. After a portion of the grain has run out the pressure upon the door is relieved and the door may be elevated by means of the handles k. In this movement the section D^2 rises until the hooks f^2 engage the upper edge thereof, after which the section D' is carried upwardly with the lower section. When the collapsed or folded door reaches the upper end of its traverse, the shaft D^3 is moved over, so as to rest upon the shoulder g, after which the folded door is swung upwardly to the position indicated in Fig. 2, where it is secured by the latch F.

It will be observed that the downturned ends of the shaft D^3 afford bearings of considerable length in the guide-grooves c^3, serving to prevent racking of the lower door-section. In the closed position of the door the lower ends of the downturned sections d of the shaft rest upon the stops d', so that the lower edge of the lower door-section does not bind upon the floor and the door-section will swing outwardly freely when its lower edge is released. At the same time a close enough joint is preserved at the floor to prevent any grain from passing through. At the vertical edges of the door-sections closer joints are required, and these are secured by the wedge action of the expanded heads h' of the plungers h. The lower edge of the door-section D' laps upon the upper edge of the door-section D^2, and it is to be observed that the flanges c^2 are so thin that the space between the overlapping portions of the door-sections is not observable. If desired, the upper door-section may be grooved lightly at the outer margins of its vertical edges to accommodate the flanges c^2.

It will be understood that changes in details of construction and in arrangement of parts within the spirit of our invention may be made. Hence no undue limitation should be understood from the foregoing detailed description, which has been given for clearness of understanding only.

What we regard as new, and desire to secure by Letters Patent, is—

1. In combination with the doorway of a car, a door composed of two vertically-sliding sections lying in different planes, when the door is closed and means for connecting the sections to cause them to move together after the lower section has been raised vertically to collapse the door, for the purpose set forth.

2. In combination with the doorway of a car, a door comprising two vertically-movable sections, guides at the door-posts, slides movable in said guides, means connecting the lower door-section pivotally with said slides, and means for connecting the door-sections to cause them to move together after the lower door-section has been raised vertically to collapse the door, for the purpose set forth.

3. In combination with the doorway of a car, guides at the door-posts, a member extending across the doorway and provided with downturned ends engaging said guides, a lower door-section pivotally connected with said member, an upper door-section inside the plane of said lower door-section, and means for supporting the upper door-section upon the lower door-section, whereby the two sections may be simultaneously lifted through

the medium of the lower section after the door has been collapsed, for the purpose set forth.

4. In combination with a doorway, guides having the upper portions of their inner flanges cut away, a member extending across the doorway and provided with downturned ends engaging said guides, a door-section pivotally connected with said member and engaging the inner flanges of said guides, releasable means upon the outer surface of said door-section engaging the outer flanges of said guides, and means for securing the door-section in an elevated position, for the purpose set forth.

5. In combination with a doorway, guides having the upper portions of their flanges cut away, a member extending across the doorway and provided with downturned ends engaging said guides, a lower door-section pivotally connected with said member and engaging the inner flanges of said guides, releasable means upon the outer surface of said door-section engaging the outer flanges of said guides, means for securing said door-section in an elevated position, and an upper door-section bearing against the inner surfaces of the inner flanges of said guides, one of said door-sections having means for engaging the other section, whereby the door-sections may be lifted together through the medium of the lower section, for the purpose set forth.

6. The combination with a doorway, of guides comprising plates and Z-bars attached to the inner surfaces of the door-posts, the upper portions of the adjacent flanges of the Z-bars being cut away, a horizontally-disposed member extending across the doorway and provided with downturned ends engaging the guides, a door-section pivotally connected with said member and free to swing outwardly, means for securing said door-section near its swinging edge, a shoulder at the upper portion of the door-frame adapted to support said horizontal member, a suitably-supported vertically-movable upper door-section, and means upon one of said door-sections for engaging the other door-section, whereby the door-sections may be raised through the medium of the lower section, for the purpose set forth.

7. The combination with a doorway of guides connected with the door-posts, a horizontally-disposed shaft extending across the doorway and provided with downturned ends engaging said guide, a lower door-section pivotally connected at its upper portion with said shaft, means for securing the lower portion of said door-section, means for supporting said shaft at the upper portion of said doorway, a vertically-movable upper door-section equipped at its upper portion with hooks for engaging the upper edge of the lower door-section, and means connected with the car-top for securing the free edges of said door-sections when the latter are swung inwardly and upwardly, for the purpose set forth.

8. The combination with a doorway, of guides comprising plates connected with the inner surfaces of the door-posts and stopping short of the top of the doorway, Z-bars connected with said plates and extending to the top of the doorway, a horizontally-disposed shaft extending across the doorway and provided with downturned ends engaging said guides, a shoulder at the upper portion of said door-frame for supporting said shaft in an elevated position, the door-frame being recessed to receive the downturned portions of said shaft, a lower door-section pivotally supported on said shaft, and an upper door-section equipped with means for engaging said shaft, for the purpose set forth.

9. The combination with a doorway, of guides at the door-posts, stops in said guides, a shaft extending across said doorway and provided with downturned ends engaging said stops, a door-section pivotally suspended from said shaft, means for securing said door-section at its lower portion, means for supporting said shaft in an elevated position, and means for securing the free edge of said door-section in an elevated position after the door has been swung inwardly, for the purpose set forth.

GEORGE I. BARNES.
FRANK E. WOODFORD.

In presence of—
L. HEISLAR,
WALTER WINBERG.