

No. 839,848.

PATENTED JAN. 1, 1907.

C. I. HOLMES & J. A. BOATRIGHT.

GRAIN CAR DOOR.

APPLICATION FILED MAR. 26, 1906.

3 SHEETS—SHEET 1.

Fig. 1.

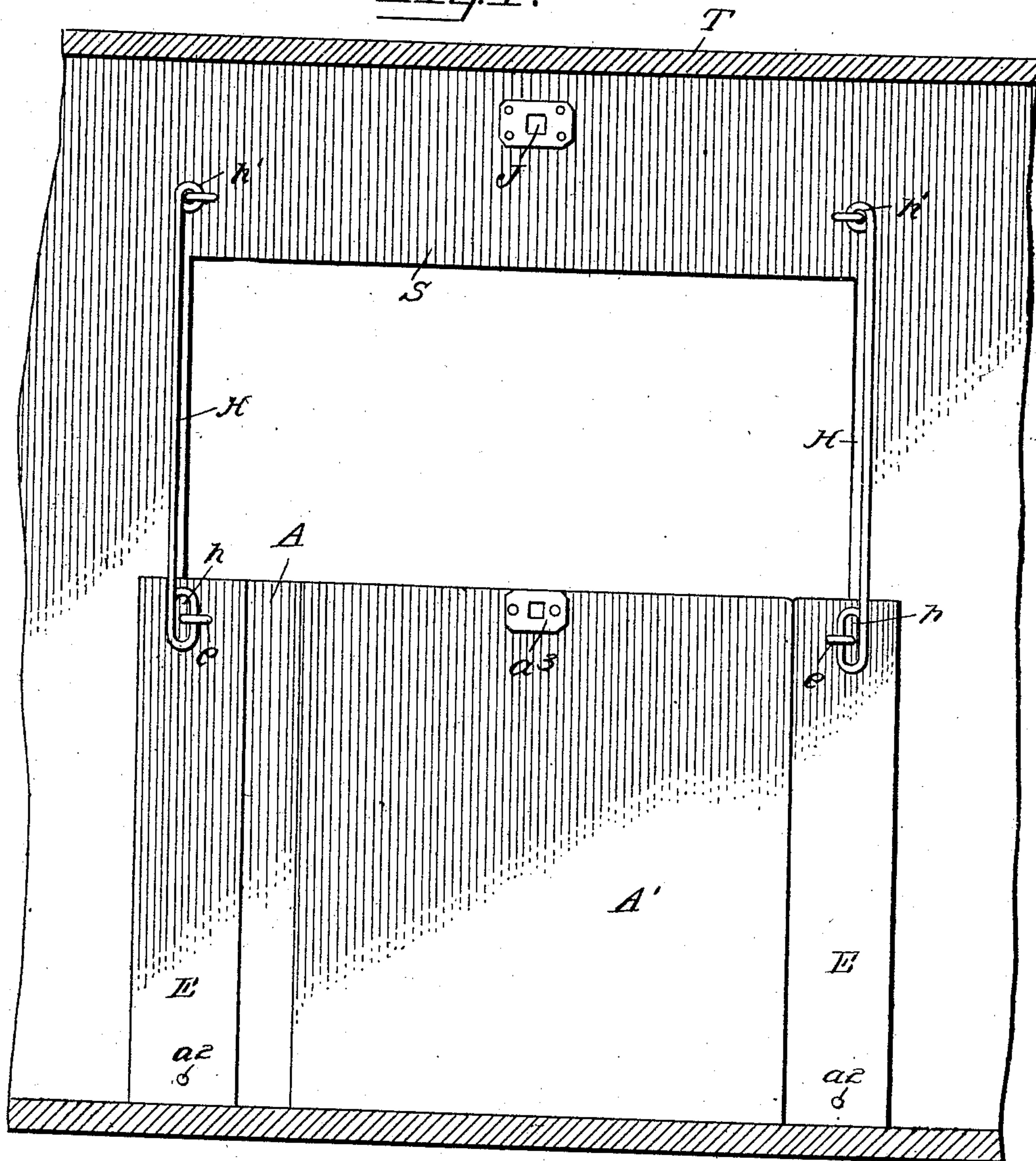
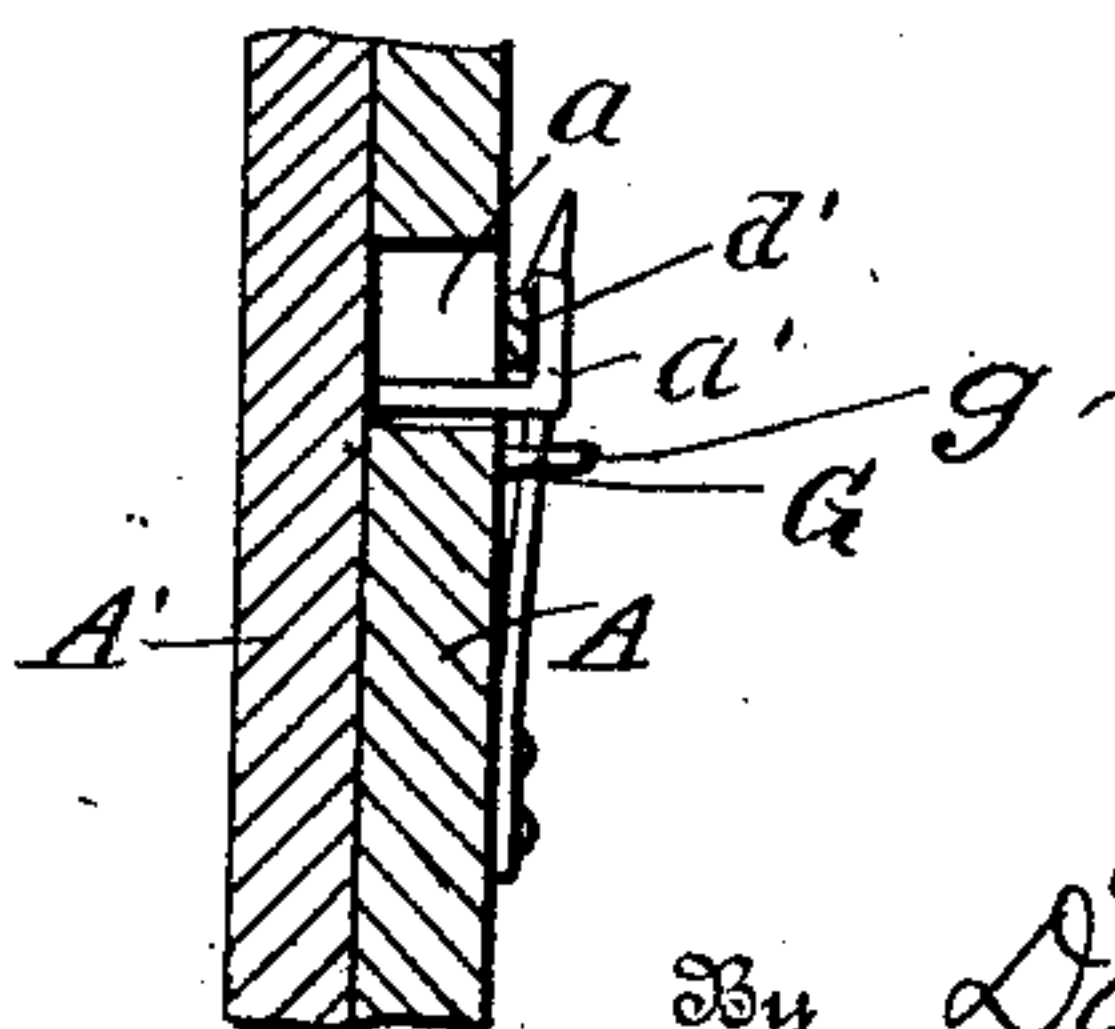


Fig. 9.



Witnesses
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3 SHEETS—SHEET 2.

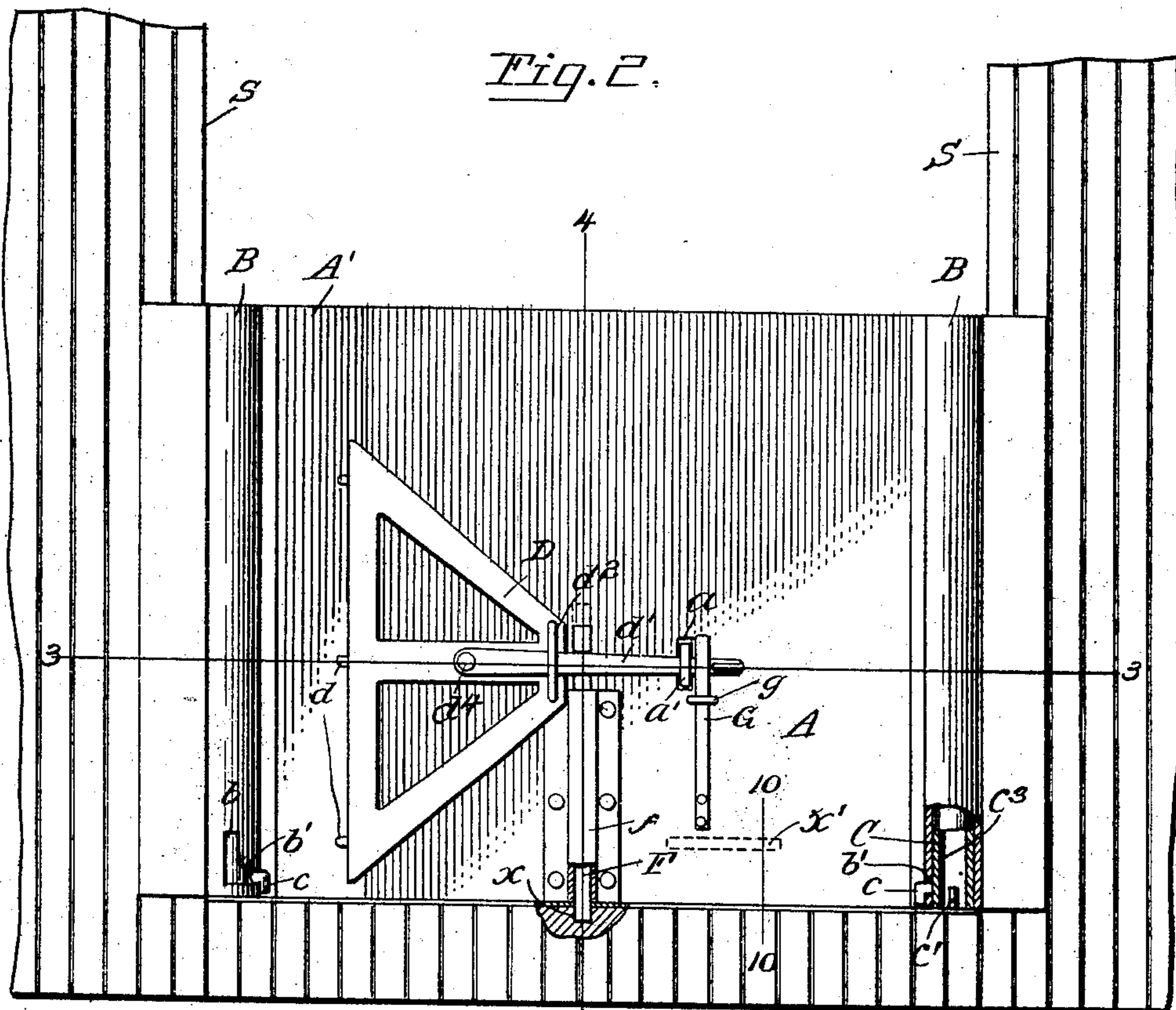


Fig. 3.

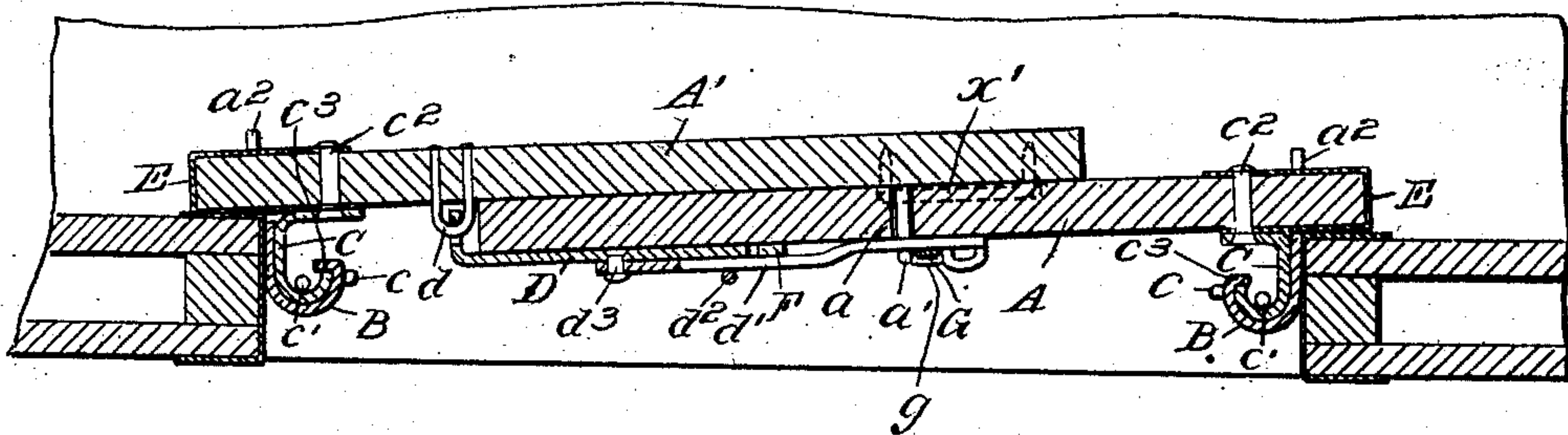
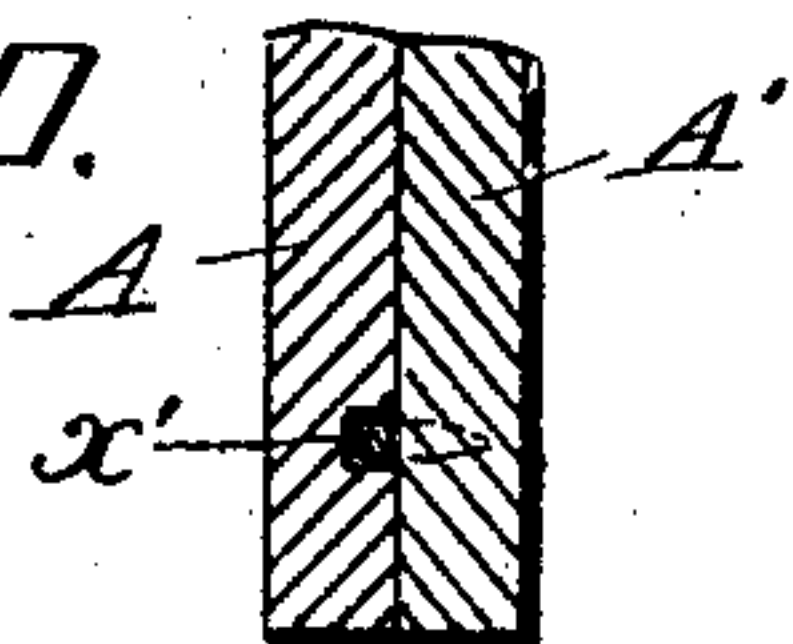


Fig. 10.



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3 SHEETS—SHEET 3.

Fig. 4.

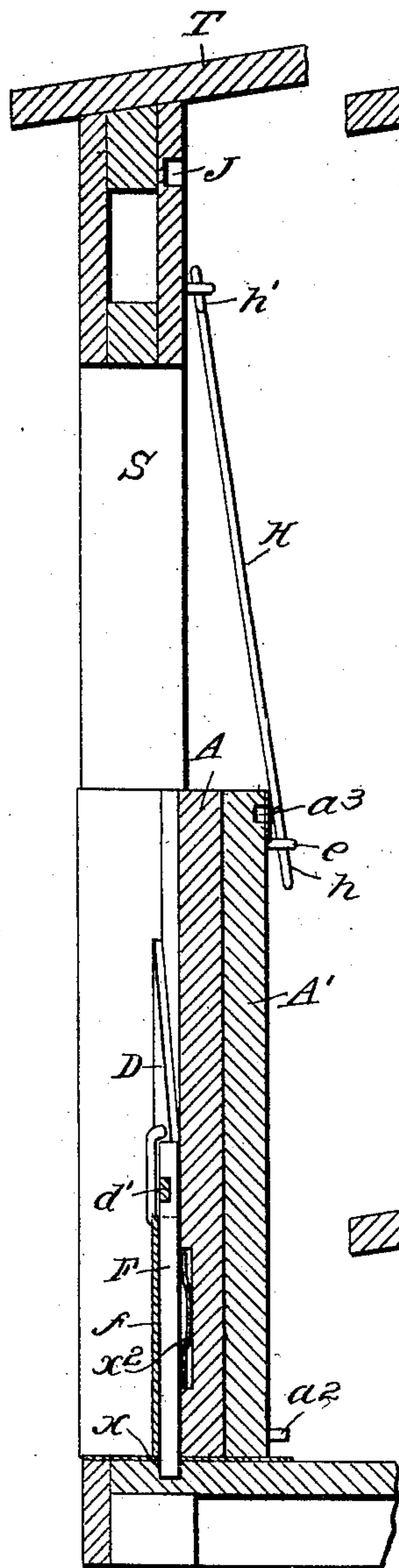


Fig. 5.

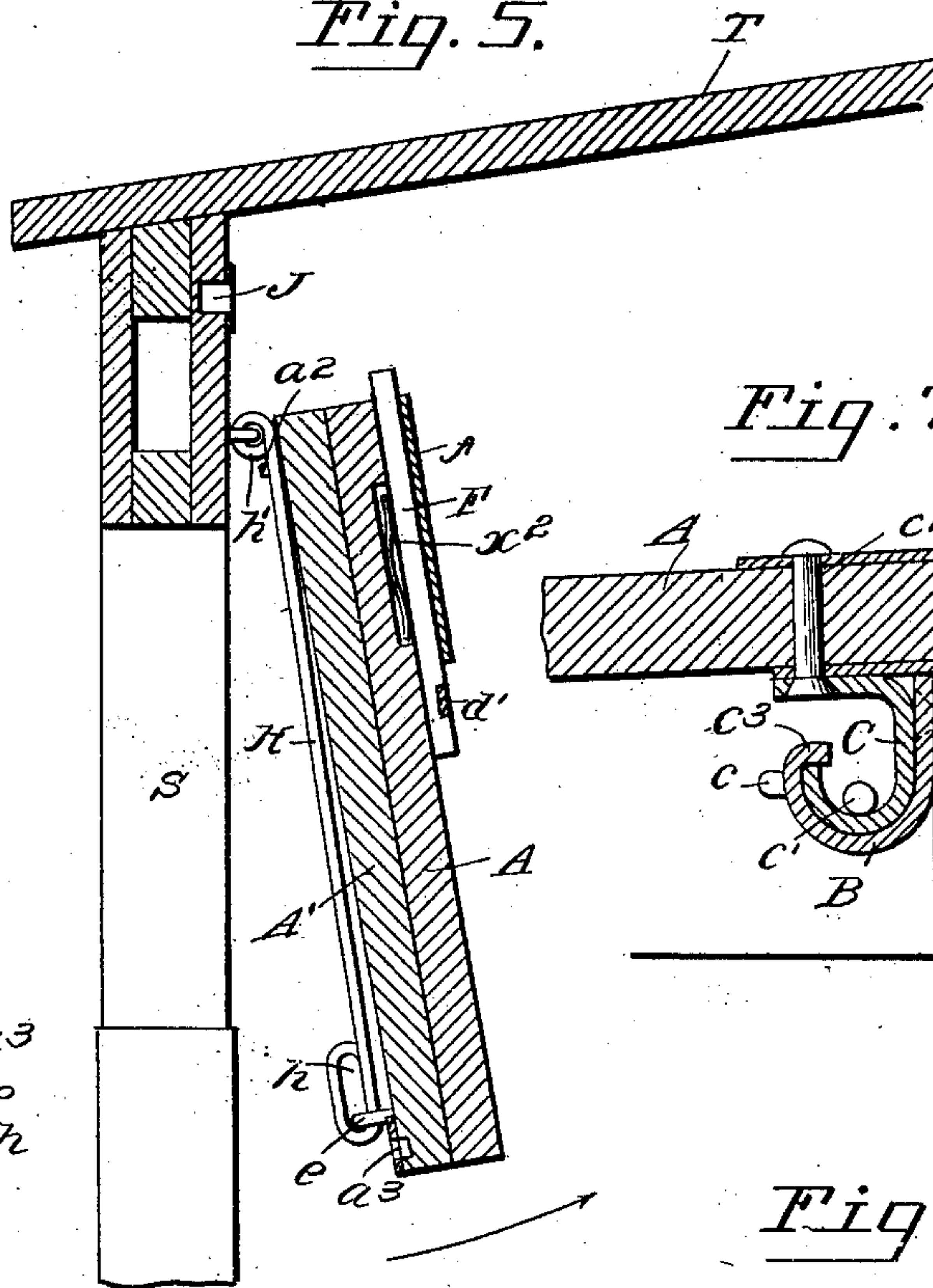


Fig. 7.

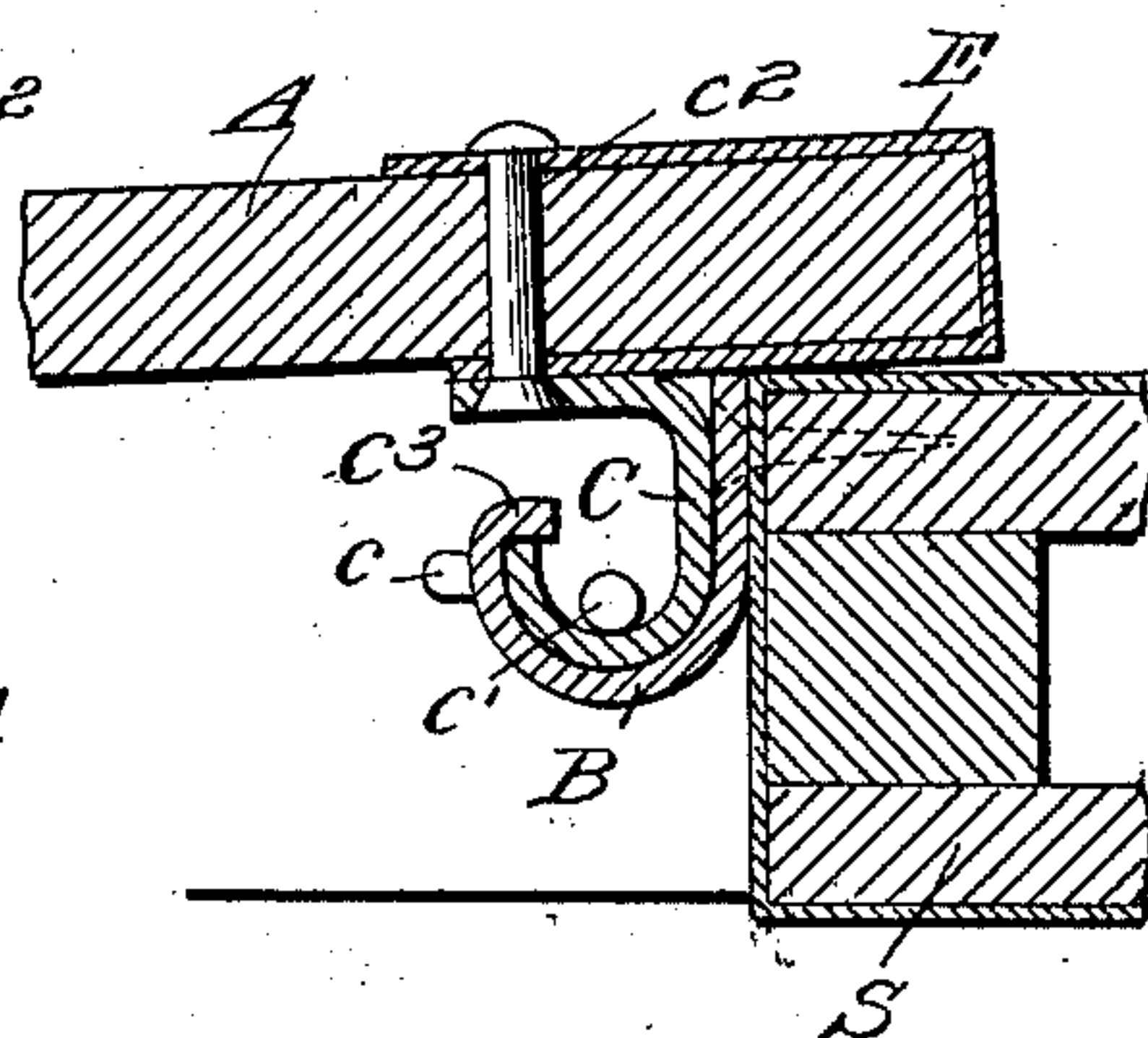


Fig. 6.

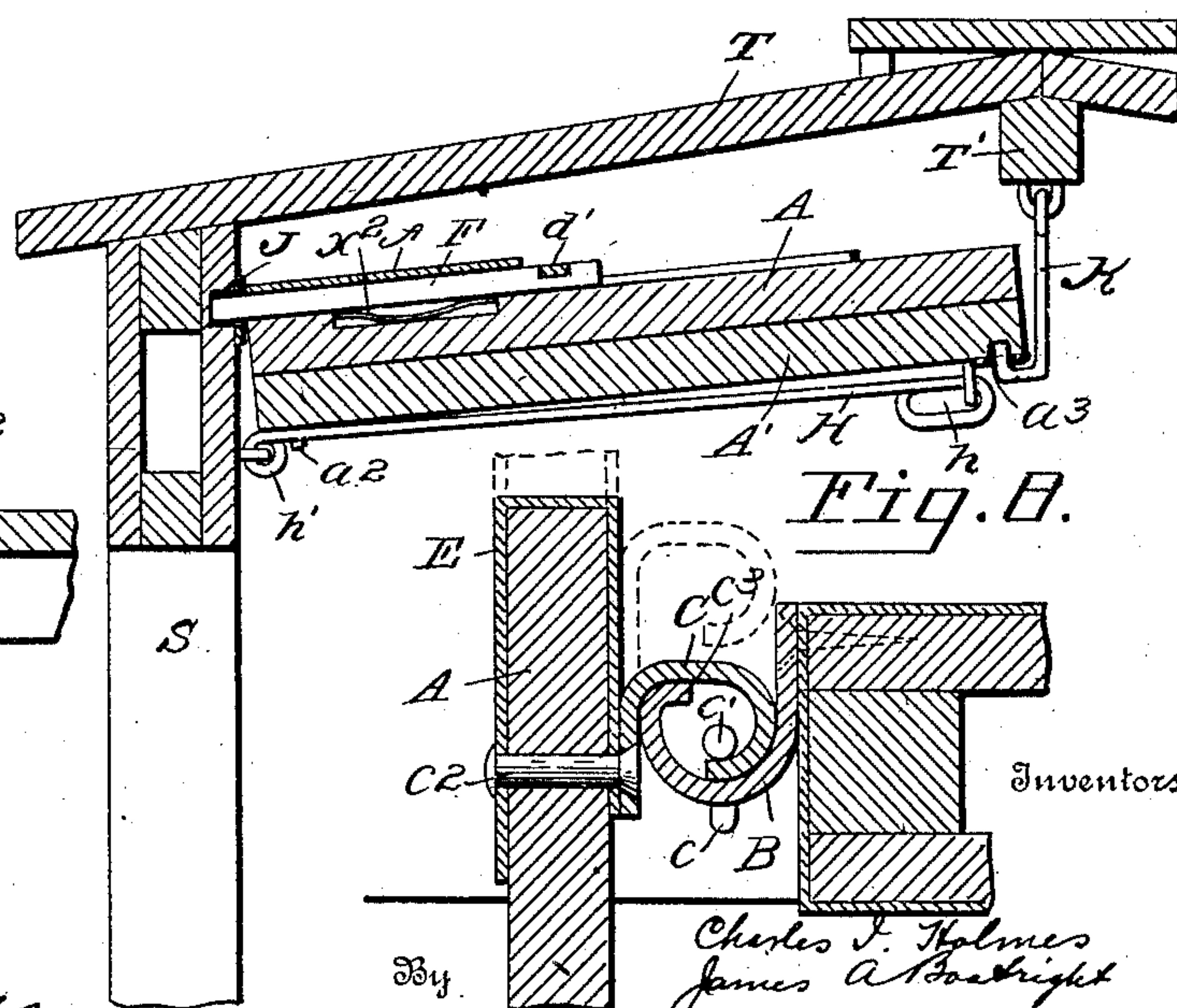
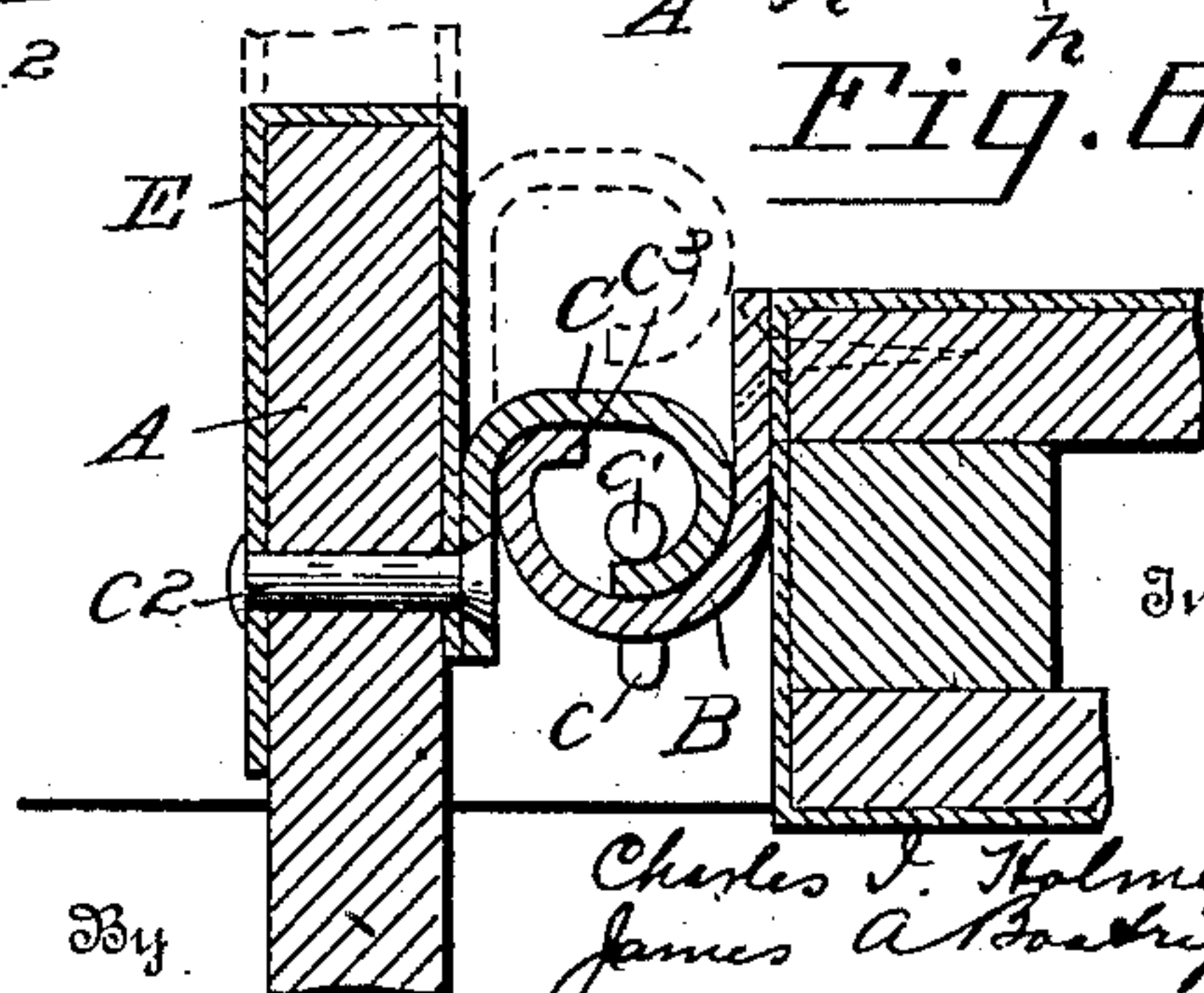


Fig. 8.



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UNITED STATES PATENT OFFICE.

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GRAIN-CAR DOOR.

No. 839,848.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed March 26, 1906. Serial No. 308,056.

To all whom it may concern:

Be it known that we, CHARLES I. HOLMES and JAMES A. BOATRIGHT, citizens of the United States of America, and residents of Thomas, county of Custer, and Territory of Oklahoma, have invented certain new and useful Improvements in Grain-Car Doors, of which the following is a full and clear specification, reference being had to the accompanying drawings, in which—

Figure 1 is an inside side elevation of the door closed; Fig. 2, an outside side elevation of the door closed, partly in section to show the locking-bolt; Fig. 3, a horizontal section on the line 3 3 of Fig. 2; Fig. 4, a vertical section on the line 4 4 of Fig. 2; Fig. 5, a view similar to Fig. 4, but showing the doors detached and folded upward upon the suspension-rods H preparatory to swinging them up to the roof of the car; Fig. 6, a similar view showing the doors swung up to the roof and there suspended by hooks K; Fig. 7, a detail horizontal section taken through one of the hinges, showing the door closed; Fig. 8, a view similar to Fig. 7 with the door open and a dotted-line representation of the door in the act of being detached from the stationary part of the hinge; Fig. 9, a detail vertical section showing the latch, and Fig. 10 a detail vertical section on the line 10 10 of Fig. 2.

This invention has special reference to that class of car-doors especially adapted for grain and other loose material carried in bulk; and the object of this invention is to provide a simple and durable door which will be easy to operate, which will absolutely prevent leakage of the contents of the car, and which may be readily detached from the door-frame and swung up to the roof of the car when not in use, as more fully hereinafter set forth.

To the accomplishment of this object and such others as may hereinafter appear the invention consists of the parts and combination of parts hereinafter fully described, and particularly pointed out in the appended claims, reference being had to the accompanying drawings, forming a part of this specification, in which the same reference characters designate like parts throughout the several views.

Referring to the drawings annexed by reference characters, A and A' designate the

two doors, each of which is hinged to a door post or frame by two hinge members C and B, a portion of each of which is substantially semicircular in cross-section and which extend the full height of the door. The member B is fixed rigidly to the side face of the door frame or post near the inner wall of the car, and the member C is fixed rigidly to the outer face of the door at a distance from its inner edge by rivets or bolts c^2 . By thus constructing the hinges the free ends of the doors may be swung outward to the position shown in Fig. 8 without separating the hinge members. To guard against separation of the two hinge members, a stop-pin c' is fixed in the door-sill close to the inner concave face of the member C. When the door is closed, its inner edge (which is desirably inclosed in a metal sheath E) overlaps and bears upon the inner wall of the car adjacent to the door-opening. It will be observed, therefore, that when the doors are closed the granular material cannot leak past the hinged ends of the doors, not only because of the contact of the inner edge of the door with the inner wall of the car, but also because of the construction of the hinge, and when the doors are open the hinge affords ample protection against leakage between the doors and the vertical stile or post of the door-frame.

The doors are of sufficient length to overlap a considerable distance upon each other when closed, and they are locked in this position by any suitable devices. We prefer the devices shown, which consist of a frame D, hinged to the inner door A' by staples d and bent near its hinged edge, so as to swing over upon the outer face of the outer door, in which position it is locked by means of a latch d' , pivoted to the frame and adapted to engage down behind a keeper-hook a' . The keeper-hook is carried by the inner door and passes through a hole a in the outer door, and the latch d' is restricted in its vertical movement by the loop d^2 and is locked in the keeper by a spring-actuated latch G, fastened to the outer door and confined thereto by a loop g . A vertically-sliding lock-bolt F is confined to the outer door by a bent plate f , attached to the door, and its upper end is notched for engagement with the latch-lever d' , whereby when the latch-lever is thrown down to engage the keeper and the latch the

lower end of the bolt will be forced down into a recess x in the door-sill, thereby locking the doors in position.

In closing the doors the frame D serves as
 5 a lever to bring their overlapping faces into close contact and to restrict the inward swing of the doors. Each outer member B of each hinge has its free vertical edge turned toward the door-post, forming a vertical
 10 flange c^3 , against which the free vertical edge of the inner hinge member abuts, as shown in Figs. 3 and 7. The outer hinge member is preferably formed of a resilient sheet metal so as to permit a slight yielding when the
 15 vertical edge of the inner member abuts against the flange c^3 , thereby making tight joints and rigidly holding the doors against the severe jarring they receive while the car is in transit. To assist in preventing the in-
 20 ner door rising, we prefer securing to the face of the same a horizontal projection x' , which is adapted to engage in a similarly shaped and located recess in the inner face of the outer door, thereby locking the doors against
 25 independent vertical movement. To force the doors downward against the floor of the car when they are closed, we provide each inner member of the hinge with a radial pin c near its lower end, which pin works through
 30 the horizontal portion of a slot cut in the outer member of the hinge, the upper edge b' of this slot being inclined downwardly and inwardly, so that when the doors are swung inwardly to a closed position these pins c
 35 engage the cam-like inclined edges of the slots, and thereby force the doors tightly against the floor to form a close fit therewith, which will prevent leakage under the doors. The outer end of each of these slots is pro-
 40 vided with an upward extension b , which will permit the door to be raised when it is swung to an open position, this raising of the door being necessary to permit the inner hinge member to pass over the top of the pro-
 45 jection c' when the door is detached by being pushed edgewise inward, as shown in dotted lines in Fig. 8.

When it is desired that the doors be laid
 50 aside out of the way, they may be detached, as shown and above described. After they are detached they are again overlapped and locked together the same as when they are in place, and when thus locked together they are swung inward and upward, as shown by
 55 the arrow in Fig. 5, until they lie against a pair of suspension-rods H, which are loosely swung at their upper ends by means of eyes h' and are loosely connected by elongated eyes h and staples e at their lower ends to the
 60 inner faces of the respective doors. When the doors are thus swung upward so as to rest against the suspension-rods H, they are then swung upward and inward together toward the roof of the car, the eyes h' serving
 65 as pivotal connections, and they are held in

this suspended position by one or more de-
 pending hooks K, swung from the roof of the car and adapted to engage in holes a^3 in the upper edge of the inner door. As the bolt F
 is always projected when the doors are locked 70 together, we provide a hole J for the reception of the projecting end of the bolt when the doors are thus swung upward out of use, and to prevent the jarring of the car from shaking the doors off the rods H we provide 75 each door near its lower edge with a pin a^2 , which pins lie adjacent to the rods and engage the same. It will be obvious that by loosely connecting the rods H at both ends these rods will not interfere with the free 80 closing and opening of the doors when they are in place on the hinges.

To hold the locking-bolt F in its withdrawn position, we may employ a spring x^2 , (shown in Fig. 4,) arranged in a suitable manner to 85 exert a frictional pressure on the bolt, thus holding it up when it is withdrawn from engagement with the sill or floor and leaving it in position to be used again without further manipulation. It will be observed that the 90 lugs or pins c' serve as guides to keep the two semicircular parts of the hinge in engagement during the opening and closing of the door and also to prevent the doors from being detached when they are in an open position. 95 It will be observed also that the hook a' is located near the end of the inner door, so that the said inner end will be drawn tightly to the inner face of the outer door when the latch-bar d' is forced down behind the said 100 hook, and with this arrangement it will be seen that the greater the outward pressure on the doors the tighter will be the joint between the outer edge of the inner door and the outer door. The projection x' is desir- 105 ably located near the free end of the inner door, as shown, so that there will be no liability of this door rising from the floor. The bolt F is especially advantageous in preventing the doors bulging outwardly when the car 110 is heavily loaded.

It will be observed that all leakage of grain or other loose material carried in bulk is absolutely prevented and also that the door is so easily opened and closed that a single 115 man can manipulate it.

It will be observed that the vertical axis of each hinge is adjacent to and in front of the face of the door-post and that the hinge members are rigidly attached, respectively, to 120 the door and the door-post, so that when the doors are swung to closed position the inner edges of the doors covered by sheathing E will bear rigidly against the inner wall of the car and not only afford a stop for the door, 125 but also make a tight closure along the entire vertical edge thereof. It will be observed, further, that the doors are long enough to overlap the greater portion of their length and that these overlapping surfaces closely 130

contact with each other throughout their length when the doors are closed, so that when clamped rigidly together they strongly brace each other, and thereby materially relieves the clamping devices when the car is loaded and there is heavy outward pressure on the doors.

It will be apparent to those skilled in the art that various mechanical embodiments of the invention are possible, and we therefore do not wish to be limited to the exact arrangement and construction shown.

What we claim, and desire to secure by Letters Patent, is—

1. In combination, a car structure provided with a door-opening, a pair of doors, a two-part hinge connecting each of the doors to the car structure, one member of the hinge being secured to the outer face of the door at a point back from its inner edge, so that said inner edge shall overlap upon the adjacent inner wall of the car when the door is closed, and the other member of the hinge being attached to the face of the adjacent door-post, the axis of the hinge being vertical and adjacent to and in front of the door-post and the door, whereby when the doors are closed their inner edges will be caused to bear throughout their length against the inner wall of the car, and means for securing the free ends of the doors.

2. In combination with a car structure, a pair of doors, a two-part hinge connecting each of them to the car structure, one member of the hinge being rigidly secured to the outer face of the door at a point back from its inner edge so that said inner edge shall overlap upon the adjacent inner wall of the car, and the other member of the hinge being rigidly attached to the face of the adjacent door-post, the axis of the hinge being thereby brought adjacent to and in front of the door-post, whereby when the doors are closed their said inner edges will be caused to bear throughout their length against the inner wall of the car, and means for securing together the free ends of the doors.

3. In combination with a car structure, a pair of doors, a two-part hinge connecting each of the doors to the car structure, one member of the hinge being rigidly secured to the outer face of the door at a point back from its inner edge and extending outwardly therefrom, and the other member of the hinge being rigidly attached to the face of the adjacent door-post, the axis of the hinge being thereby brought in front of the face of the door-post, the last-named member of the hinge being slightly elastic and provided with a stop-flange at its free edge, and means for securing the free ends of the doors together, for the purposes herein set forth.

4. In combination with a car structure, a pair of doors each hinged at its outer edge to the door-opening, means for fastening to-

gether the free ends of the doors, each of said hinges being constructed of a pair of vertical plates one of which is attached to the door and projects outwardly from the outer face thereof and has its free vertical edge curved, the other plate being attached to the door-post at one edge and having its other edge curved to embrace the curved portion of the other plate, and means for holding the curved portions of these plates in engagement and at the same time allow them a free hinge action, whereby when the doors are open these hinges entirely close the gap between the doors and the adjacent door-post.

5. In combination with a car provided with a door-opening, a hinge member projecting from the face of each door-post and curving inwardly to a substantial semicircle, the free vertical edge of this plate being provided with a stop-flange, a pair of doors each having projecting from its face a vertical plate whose free edge is curved to fit and work within the curved portion of the hinge member carried by the post, and means for holding said hinge-plate members in engagement, said hinge members serving to close the gap between each door and the adjacent post when the door is open.

6. In combination with a car having a door-opening in its side wall, of a pair of doors adapted to overlap when closed, means for clamping the overlapped ends together, and means for hinging the other ends of the doors to the car structure, said means comprising each a pair of interfitting curved leaves or members, one member being attached to the face of the door at a point back from its hinged end so that this end of the door shall overlap upon the inner wall of the car, and the other member being attached to the adjacent door-post, said members consisting of a pair of imperforate plates extending the full height of the door and being adapted to overlap and close the gap between the door and the adjacent post when the door is open.

7. In combination with a car having a door-opening in its side wall, of a pair of outwardly-swinging doors hinged at their inner ends to the structure, means for securing together the free ends of the doors, and means embodied in the hinges for causing the doors to bind against the floor of the car when they are swung to a closed position.

8. In combination, with a car having a door-opening in its side wall, of a pair of outwardly-swinging doors hinged at their inner ends to the structure, means for securing together the free ends of the doors, and means for causing the doors to bind against the floor of the car when they are swung to a closed position, said means consisting of a pin or lug carried by one member of each hinge and a cam carried by the other member of the hinge.

9. In combination, a car structure pro-

vided with a door-opening, a pair of doors, a two-part hinge connecting each of the doors to the car structure, one member of the hinge being secured to the outer face of the door at a point back from its inner edge, so that said inner edge shall overlap upon the adjacent inner wall of the car when the door is closed, and the other member of the hinge being attached to the face of the adjacent door-post, the axis of the hinge being vertical and adjacent to and in front of the door-post and the door, whereby when the doors are closed their inner edges will be caused to bear throughout their length against the inner wall of the car, each door and its attached hinge member being capable of vertical movement with respect to the stationary hinge member, and a guide and stop-pin fastened in the floor of the car structure, for the purpose set forth, and means for securing the free ends of the doors.

10. In combination with a car structure, of a pair of outwardly-swinging doors adapted to overlap when closed, a lever-like frame pivoted to the outer face of the inner door at a point beyond the free edge of the outer door and adapted to swing over upon the face of the outer door, a latching device carried by this frame, and a hook or keeper carried by the inner door and extending through an opening in the inner door and adapted to be engaged by said latch device.

11. In combination with a supporting structure having a door-opening, a pair of doors hinged thereto and adapted to overlap, a frame pivoted to the inner door and adapted to swing over upon the outer door and car-

rying a latch member, means for locking this latch member, and a floor-engaging locking-bolt engaging with and operated by said latch member.

12. In combination with a car, of a door detachably hinged thereto, a hook depending from the roof of the car, and a pair of links pivotally connected at their upper ends to the upper part of the wall of the car and pivotally and loosely connected at their lower ends to the inner face of the door, the loose connection between the links and the door permitting the door to be swung upward and over upon the links, for the purpose set forth.

13. In combination with a car and a door-post, of two overlapping sections and means for detachably connecting the overlapped portion of the sections and means for detachably hinging each section to one of the door-posts, of a pair of independent links or rods pivotally connected at their upper ends to the car structure and having a loose pivotal and sliding connection at their lower ends with the door, whereby the locked door-sections may be swung upward and over upon the links or rods, and means for suspending the doors and rods from the ceiling of the car.

In testimony whereof we hereunto affix our signatures, in the presence of two witnesses, this 22d day of March, 1906.

CHARLES I. HOLMES.
JAMES A. BOATRIGHT.

Witnesses:

T. S. GARVIN,
F. C. JENKINS.