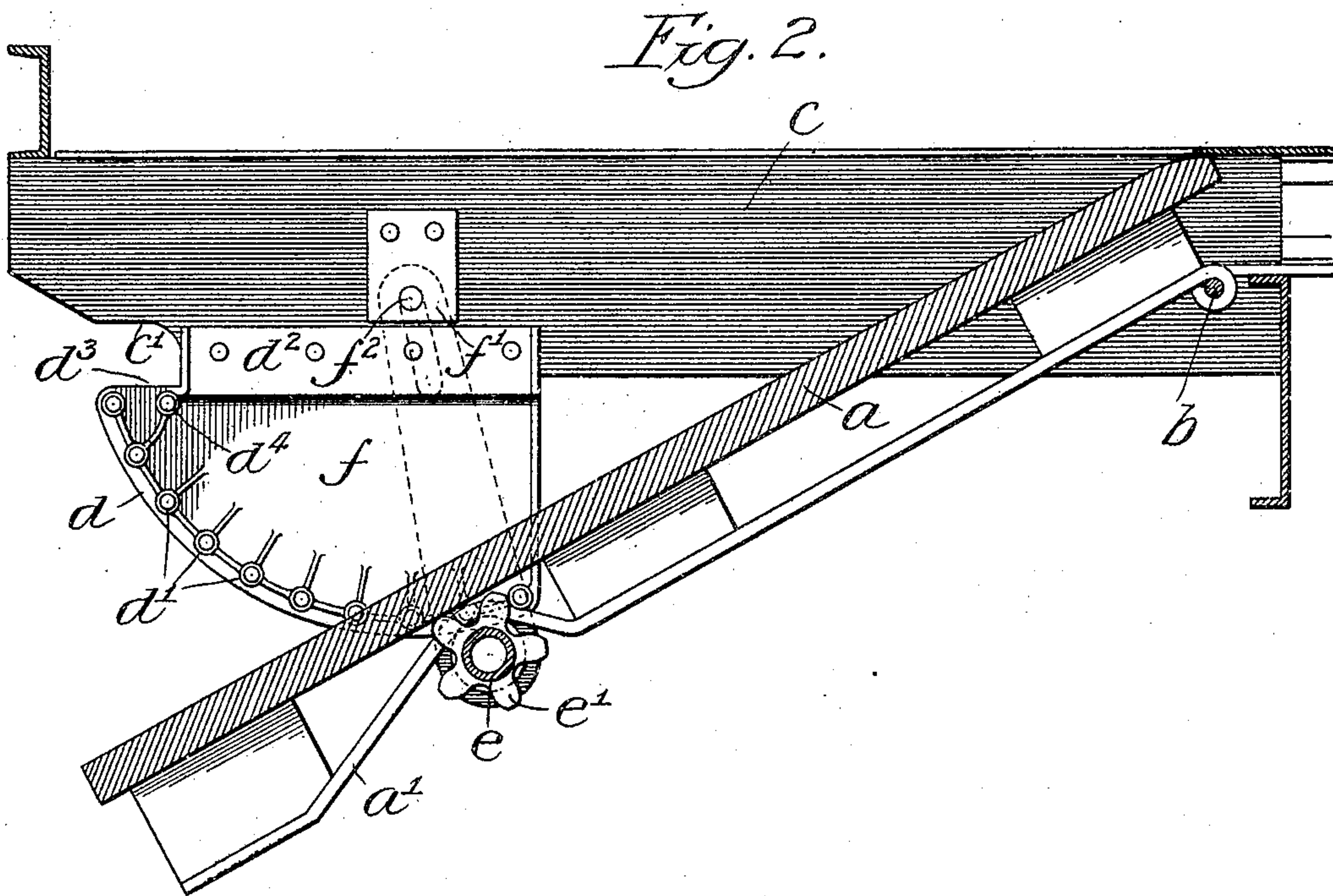
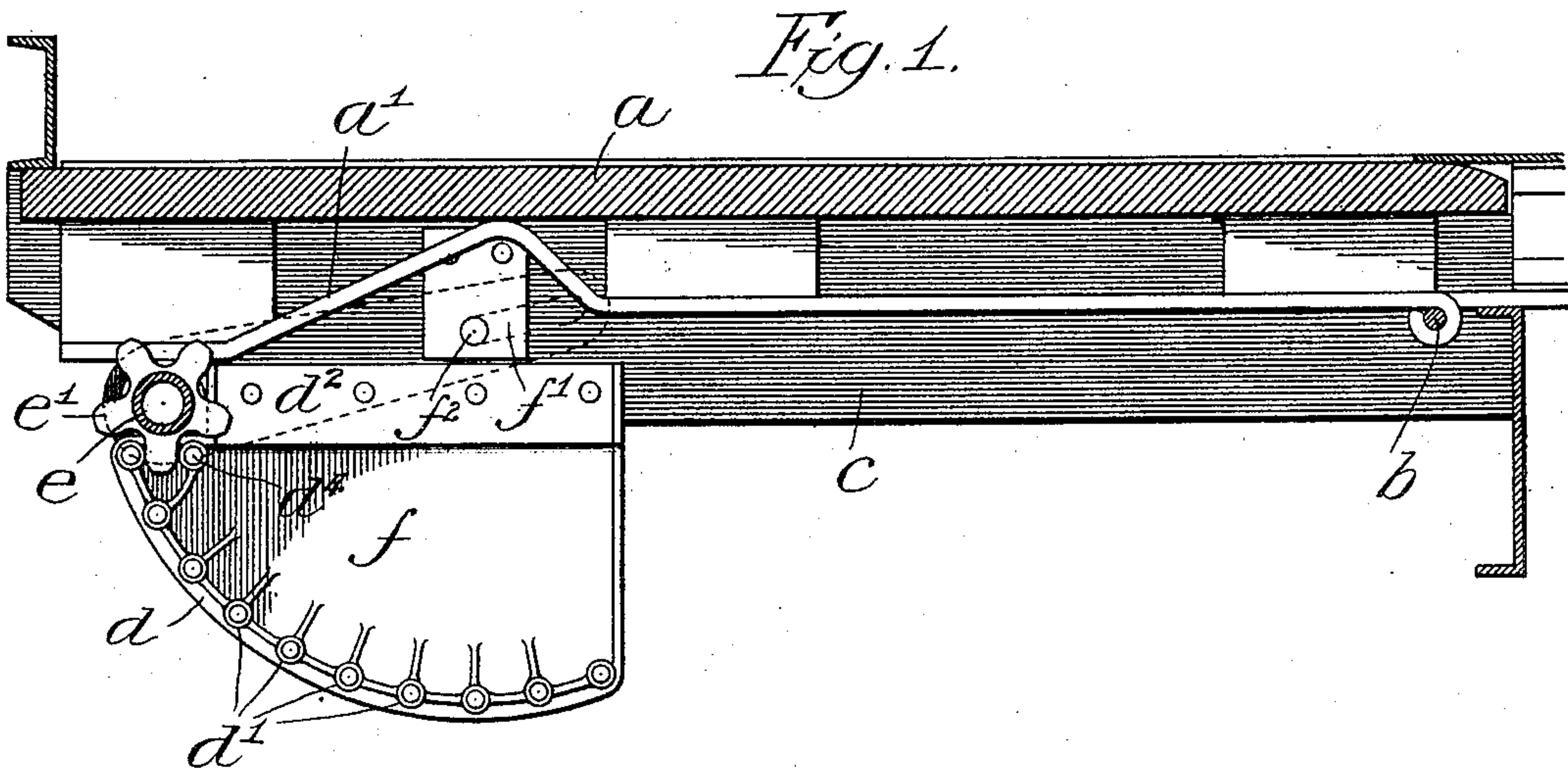


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APPLICATION FILED APR. 13, 1907.

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Patented Sept. 28, 1909.

2 SHEETS—SHEET 1.



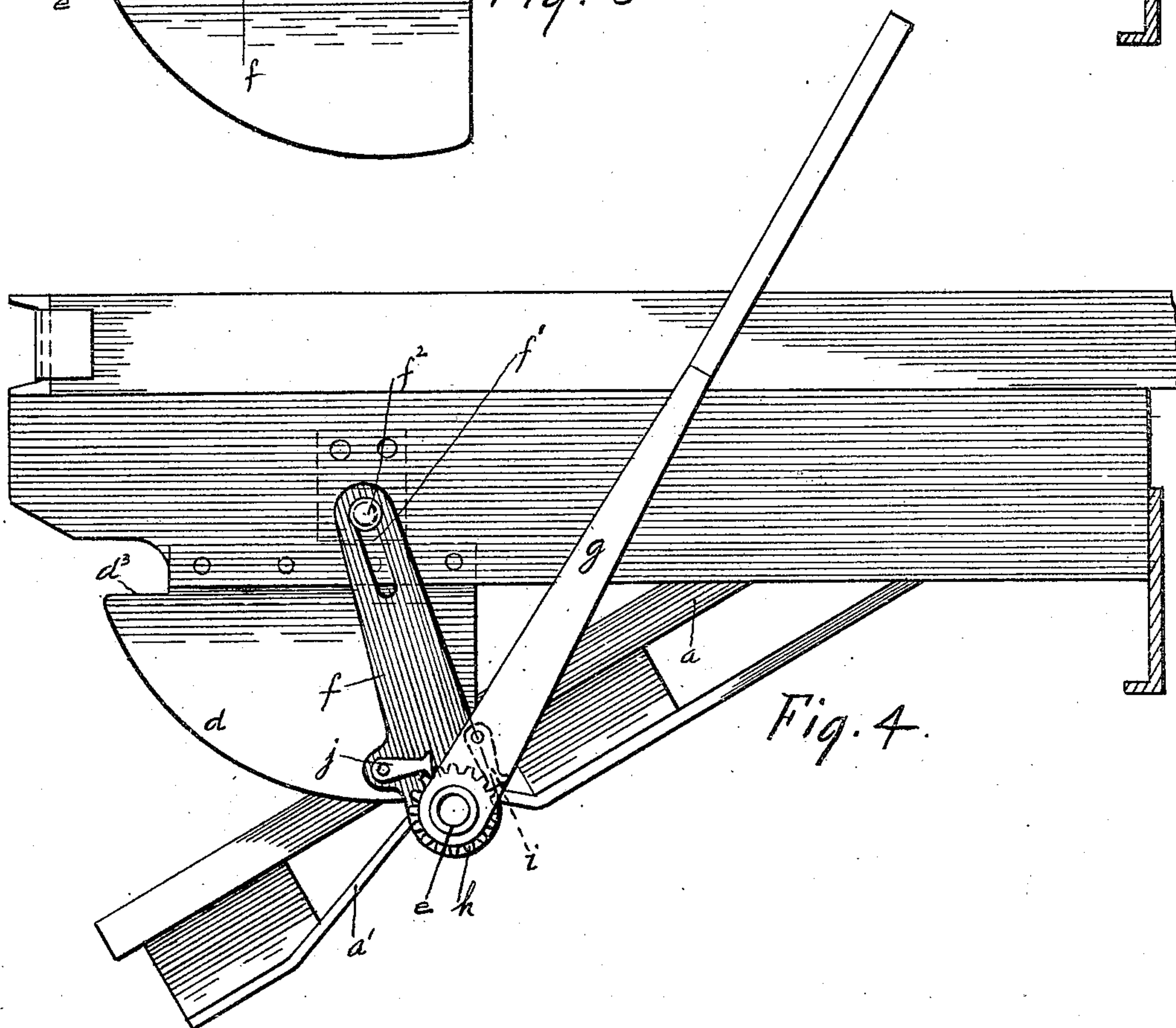
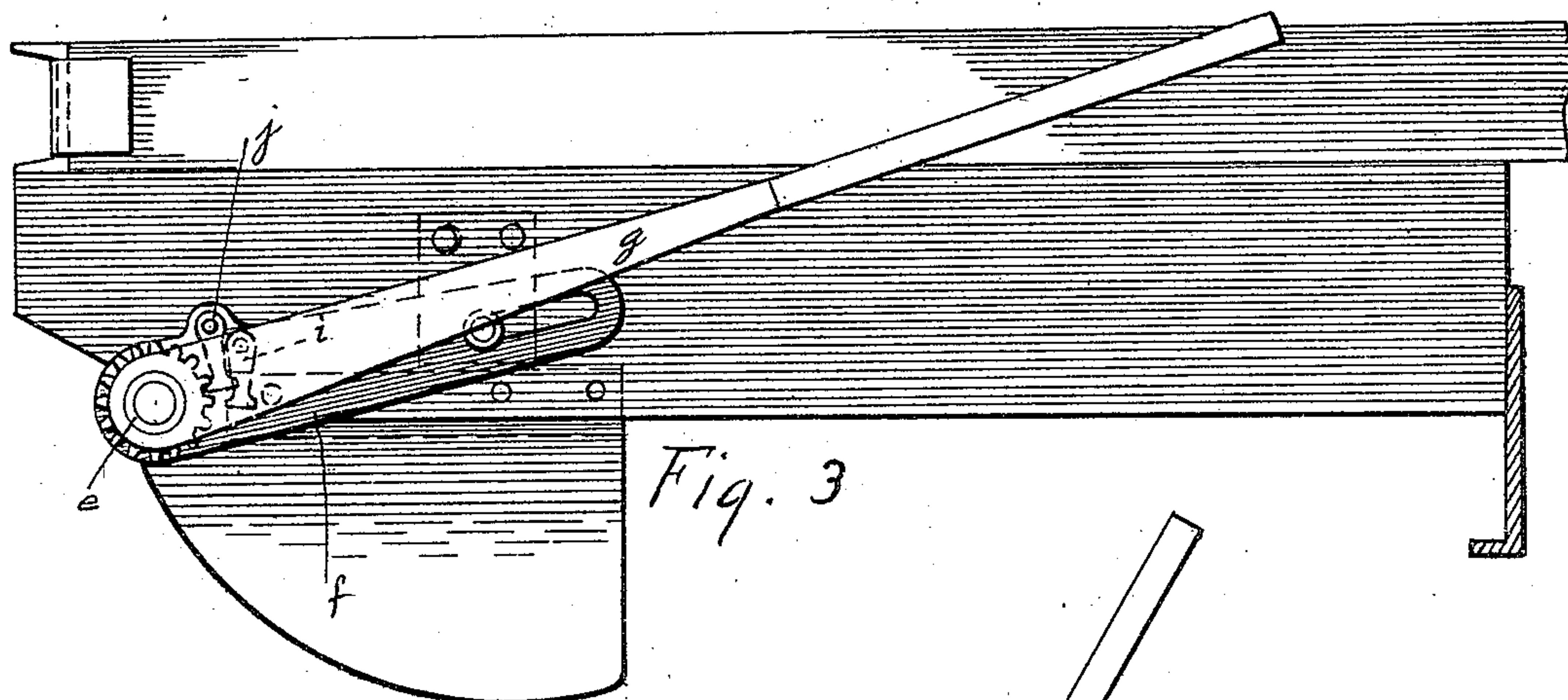
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# UNITED STATES PATENT OFFICE.

SPENCER OTIS, OF CHICAGO, ILLINOIS, ASSIGNOR TO NATIONAL DUMP CAR COMPANY,  
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DOOR-OPERATING MECHANISM FOR RAILWAY-CARS.

935,050.

Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed April 13, 1907. Serial No. 368,058.

*To all whom it may concern:*

Be it known that I, SPENCER OTIS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Door-Operating Mechanism for Railway-Cars, of which the following is a specification.

My invention relates to railway cars, especially to that type of dump car having dumping doors in its floor, and has for its object to provide a new and improved operating and supporting mechanism for these doors.

In the accompanying drawing—Figure 1 is a transverse section through one of the dumping doors of such a car, showing my improved operating and supporting mechanism, the door being in closed position. Fig. 2 is a similar view, showing the door in its open position. Fig. 3 is a fragmentary view of part of the end of the car, showing the mechanism for rotating the door operating shaft, the parts being in the position assumed when the door is closed. Fig. 4 is a view similar to Fig. 3, but showing the parts in the position assumed when the door is opened.

As is well-known, side dumping cars of the "National" type embody a flat floor composed entirely, or substantially entirely, of dumping doors hinged in series on each side of the center sill. These doors are supported by a shaft extending longitudinally of the car, the doors being opened and closed and supported during their opening and closing movements by the operation of the shaft.

In the drawings, *a* indicates one of the hinged dumping doors, hinged as usual to or adjacent to the center sill at *b*.

*c* represents one of the transverse members of the underframe.

*d* is a plate having a curved edge extending downwardly and inwardly in relation to the car underframe, this curved plate being formed with a rack *d'*, the teeth of which are spaced apart, as clearly indicated in the drawings. This rack is connected along its upper portion *d<sup>2</sup>* to the transverse member of the underframe near the outer end thereof. The rack plate is provided at its upper outer corner with a recessed portion *d<sup>3</sup>* and the end of the transverse member of the underframe is correspondingly recessed, form-

ing at the outer end of this transverse member an inwardly extending recessed portion. It will be observed that I provide on the end of the transverse member of the underframe a downwardly and inwardly extending rack. At the upper end of this rack I provide a horizontal inwardly extending portion by means of additional teeth *d<sup>4</sup>*. The door supporting shaft *e*, which travels upon the inclined track *a'* fixed to the under side of the door, as is usual in this type of car, rests, when the door is in closed position, upon this horizontal inwardly extending portion of the rack, the shaft being provided with suitable gear wheels *e'* engaging the rack, as will be readily understood.

When in its closed position, the shaft forms a secure and efficient supporting and locking device to hold the door in its closed position. The shaft is rotatably mounted in swinging arms *f*, which are hung from pivots *f<sup>2</sup>* suitably connected to the underframe of the car, and these swinging arms are provided with slots *f'* for a purpose presently to be described. The shaft may be operated by any suitable operating mechanism, as, for example, by suitable lever and ratchet wheels mounted upon the end of the shaft, such as disclosed, for example, in the patent to Caswell Reissue No. 12,447, reissued February 16, 1906, or in the patent to Otis No. 780,759, of January 24, 1905.

Mechanism for operating the shaft *e* adapted for use with the structure above described is illustrated in Figs. 3 and 4. The operating lever *g* is pivoted upon the shaft *e* and carries a reversible pawl *i*. A detent *j* is pivotally mounted upon the hanger *f* and serves to restrain the shaft *e* against reverse movement when the same is being actuated by the lever *g* and pawl *i*. It will readily be apparent that in raising the door from the position shown in Fig. 4, the pawl *i* will be turned to the position shown, thus engaging the pinion *h* which is fixed to the shaft *e* and the shaft will be rotated in clockwise direction. When the lever is thrown over to begin a new stroke the shaft *e* will be held against reverse rotation by the detent *j*, and as the pinions *e'* upon the shaft *e* are in engagement with the rack teeth *d'* the shaft and hanger *f* will be held against downward movement. The pinion *h*, of course, is constructed of sufficient width to permit the pawl *i* and detent *j* to engage



therewith without conflict. In its movement to open and close the doors, the shaft swings inwardly and outwardly, the gear wheels thereon traveling upon the outer face of the curved rack, being held in engagement therewith through the swinging links *f*. When the door reaches its closed position, the shaft traveling over the horizontal upper part of the rack runs inwardly, this inward motion being permitted by means of the slotted connection between the swinging arm and its pivot.

It will be seen that I have provided a very simple guiding and operating mechanism, in which the shaft is guided during its movements, and one in which the shaft forms a very efficient supporting means for the door both in open and closed positions and during its movements.

I claim:

1. A car comprising a hinged door, a rotatable shaft mounted in a pivoted bearing, means for rotating said shaft, and means engaging said shaft to cause it to move bodily when rotated.

2. A car comprising a hinged door, a rack mounted in the car underframe and provided with teeth on its under and upper surface, a rotatable shaft mounted in a movable bearing, a gear upon said shaft meshing with said rack, and means for rotating said shaft.

3. A car comprising a hinged door, a rotatable shaft mounted in a pivoted and bodily movable arm, a rack having teeth on its under surface concentric with the pivot referred to and also having teeth on its upper surface, and a pinion on said shaft engaging said rack.

4. In a car, a hinged door, a rotatable shaft mounted in a movable bearing, a support fixed to the car underframe, means causing said shaft when rotated to move outwardly and upwardly beneath said door and inwardly between said door and support.

5. A railway car having a floor comprising hinged dumping doors, a swinging rotatable shaft mounted in the underframe of the car supporting and operating the doors, a downwardly curved rack having the hori-

zontal upper portion secured to a transverse member of the underframe, a gear wheel on the shaft engaging the outer face of the rack, and means permitting the inward movement of the shaft when the door reaches its closed position.

6. A railway car having a floor comprising hinged dumping doors, a plate attached to the underframe, said plate being provided with a downwardly and inwardly curved guide on its outer face and with a horizontal upper portion, and a door operating shaft engaging the curved outer face of the guide during the opening and closing movements of the door and resting on the horizontal portion of the guide when the door is in closed position.

7. A railway car having a floor comprising hinged dumping doors, a door operating and supporting shaft extending longitudinally of the car beneath the doors, slotted swinging arms in which the shaft is journaled, guide plates having a curved guiding face engaged by the shaft during the opening and closing movements of the door, and a horizontally supporting face engaged by the shaft when the door is closed.

8. A railway car having a floor comprising hinged dumping doors, a plate attached to the underframe provided with a curved guide portion and a horizontal supporting portion, a door supporting and operating shaft, and means for holding the shaft in engagement with the curved face of the plate during the opening and closing movements of the door and for permitting the inward movement of the shaft when the door is closed.

9. A railway car having a floor comprising hinged dumping doors, a swinging rotatable shaft mounted in the frame of the car and engaging the under face of the doors to open and close the doors, and positive means also mounted in the underframe for compelling the rotation of the shaft during the opening and closing movements of the door.

SPENCER OTIS.

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