

J. A. KING.  
GRAIN DOOR.

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951,281.

Patented Mar. 8, 1910.

2 SHEETS—SHEET 1.

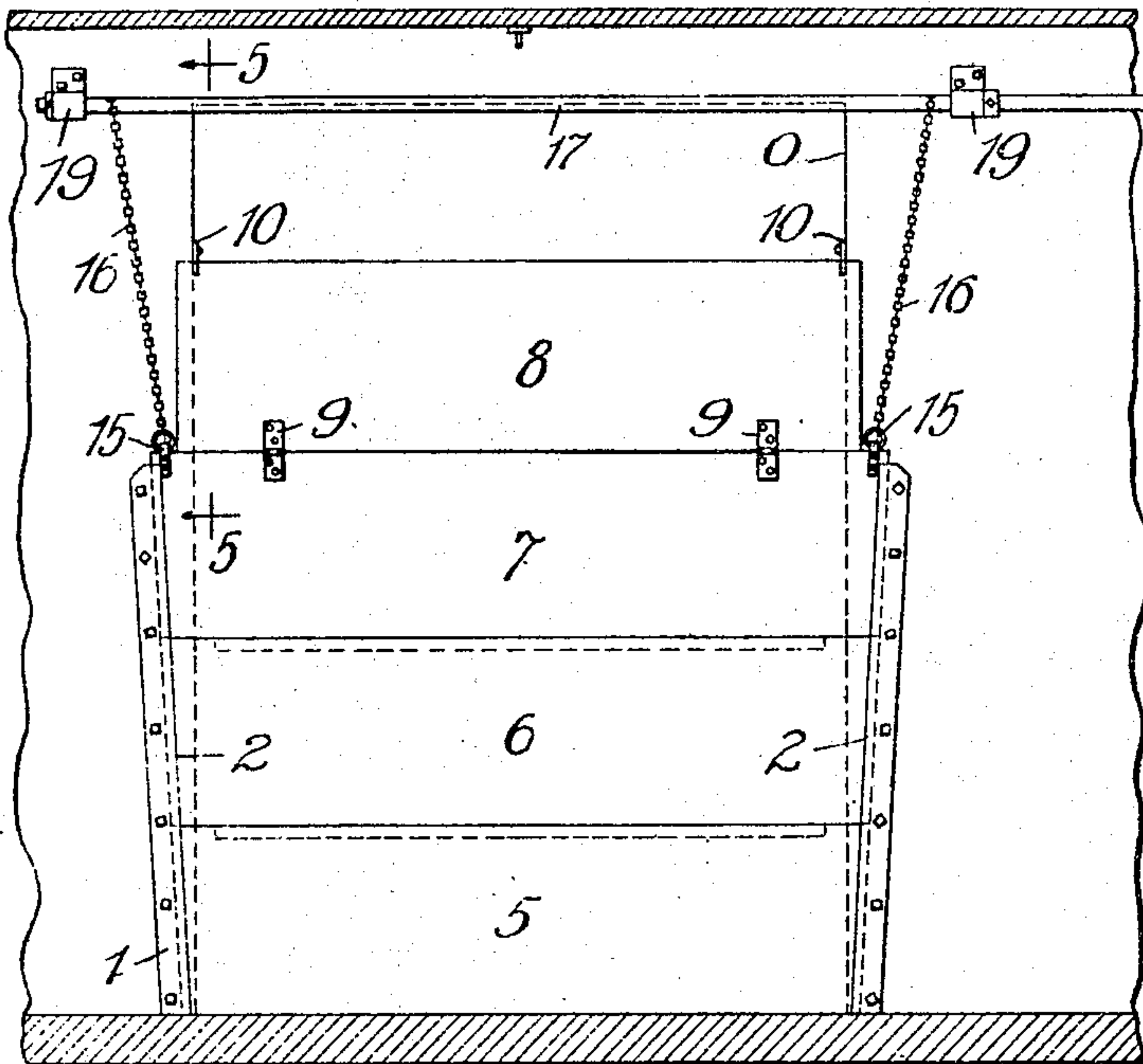


Fig. 1

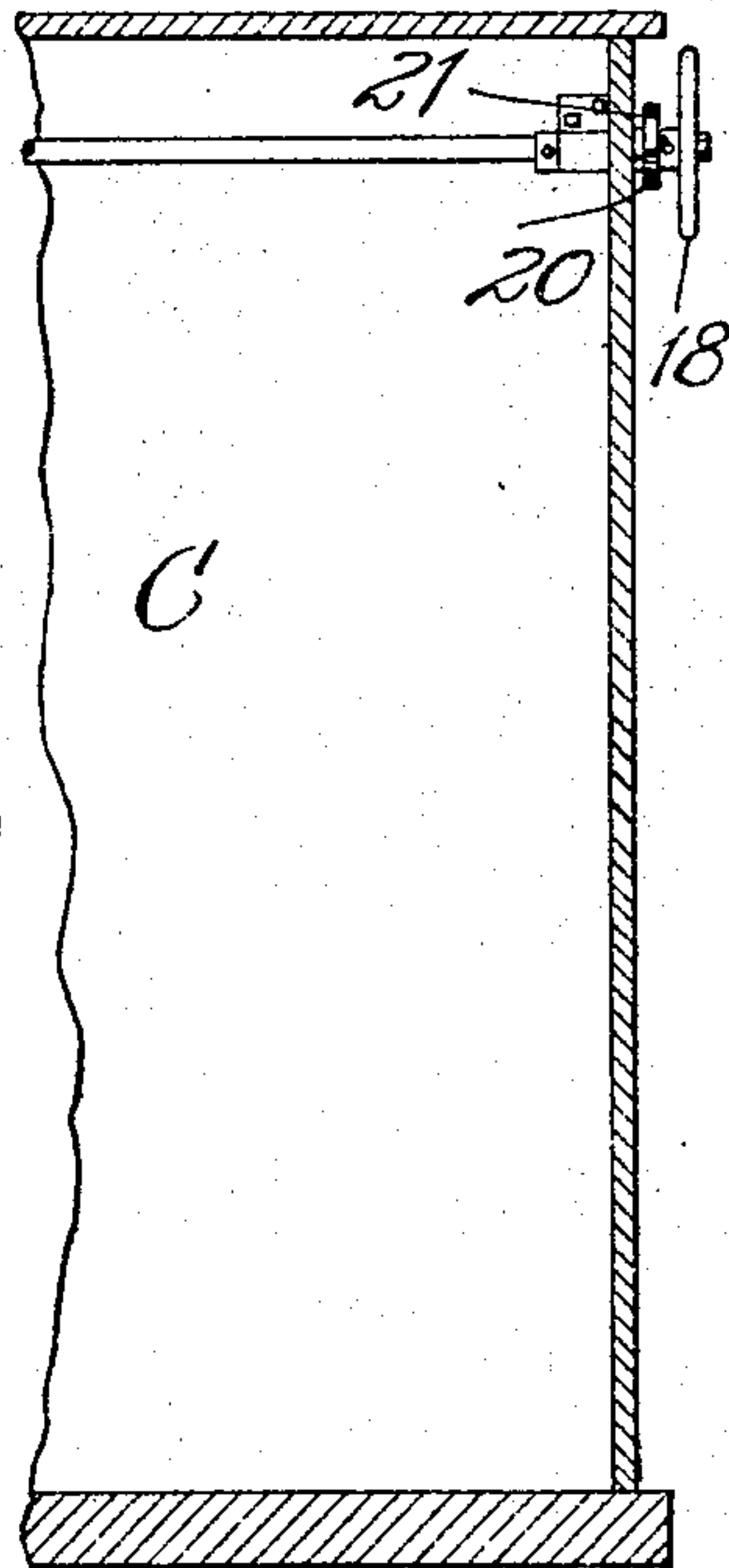
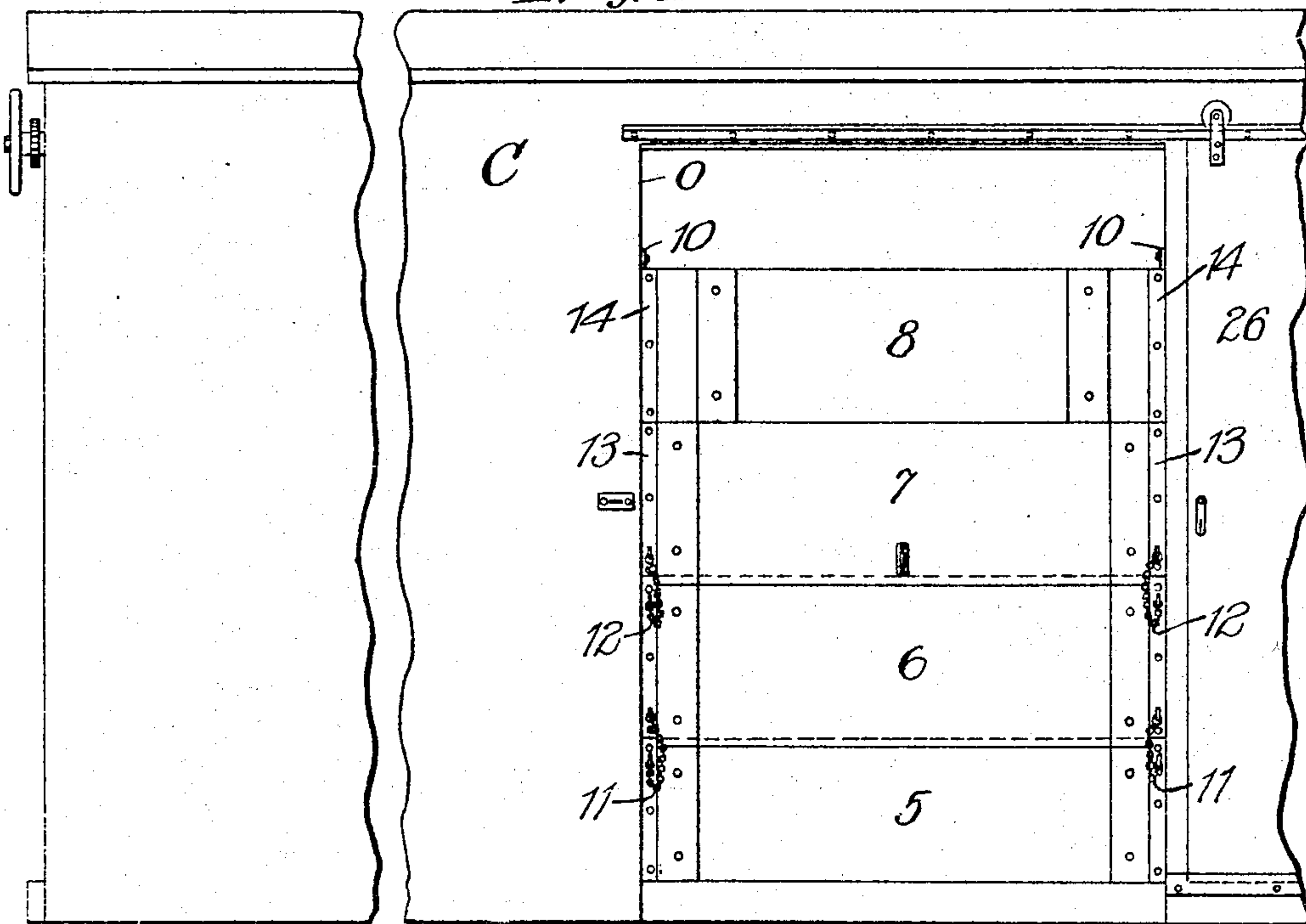


Fig. 2.



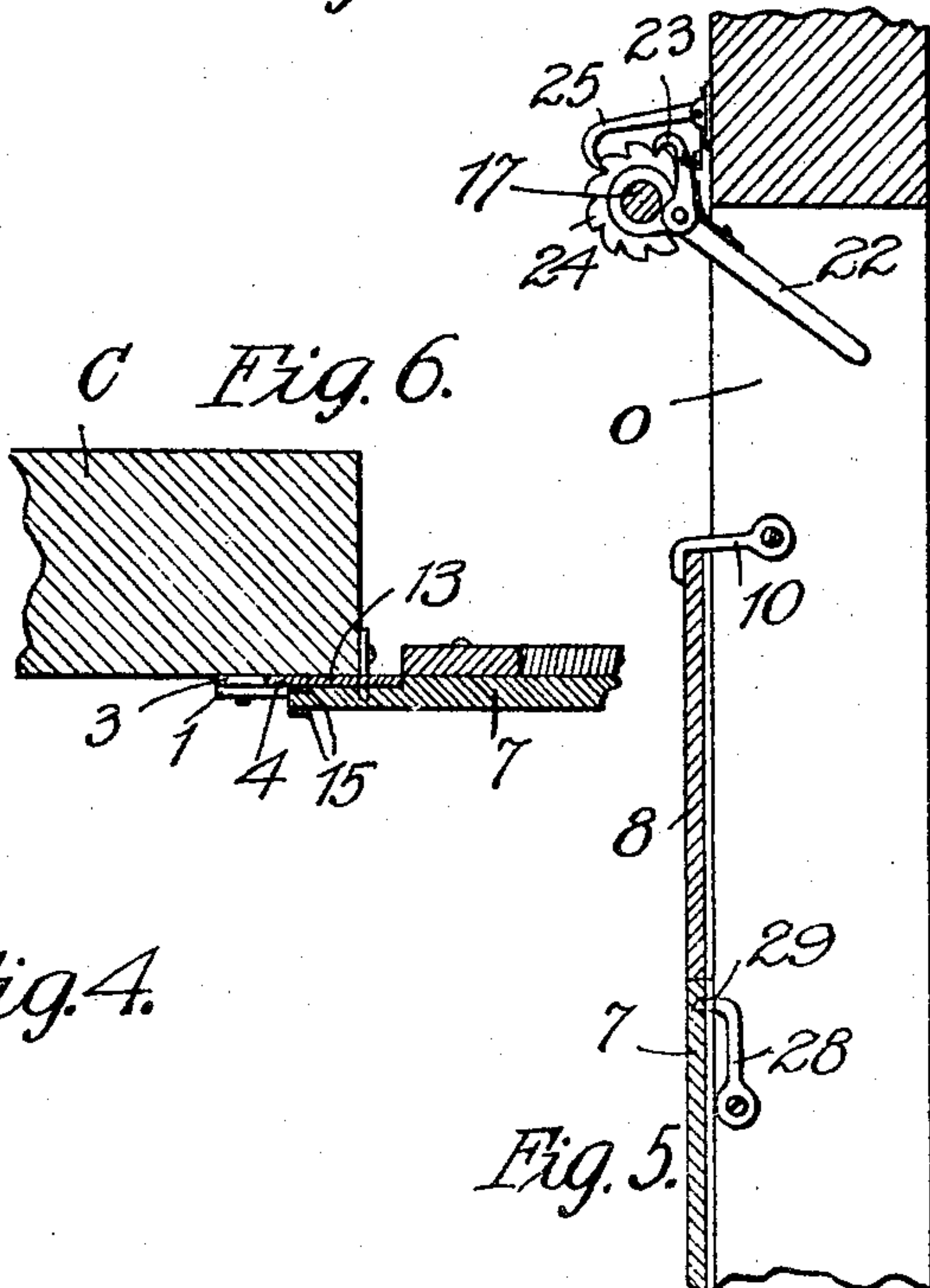
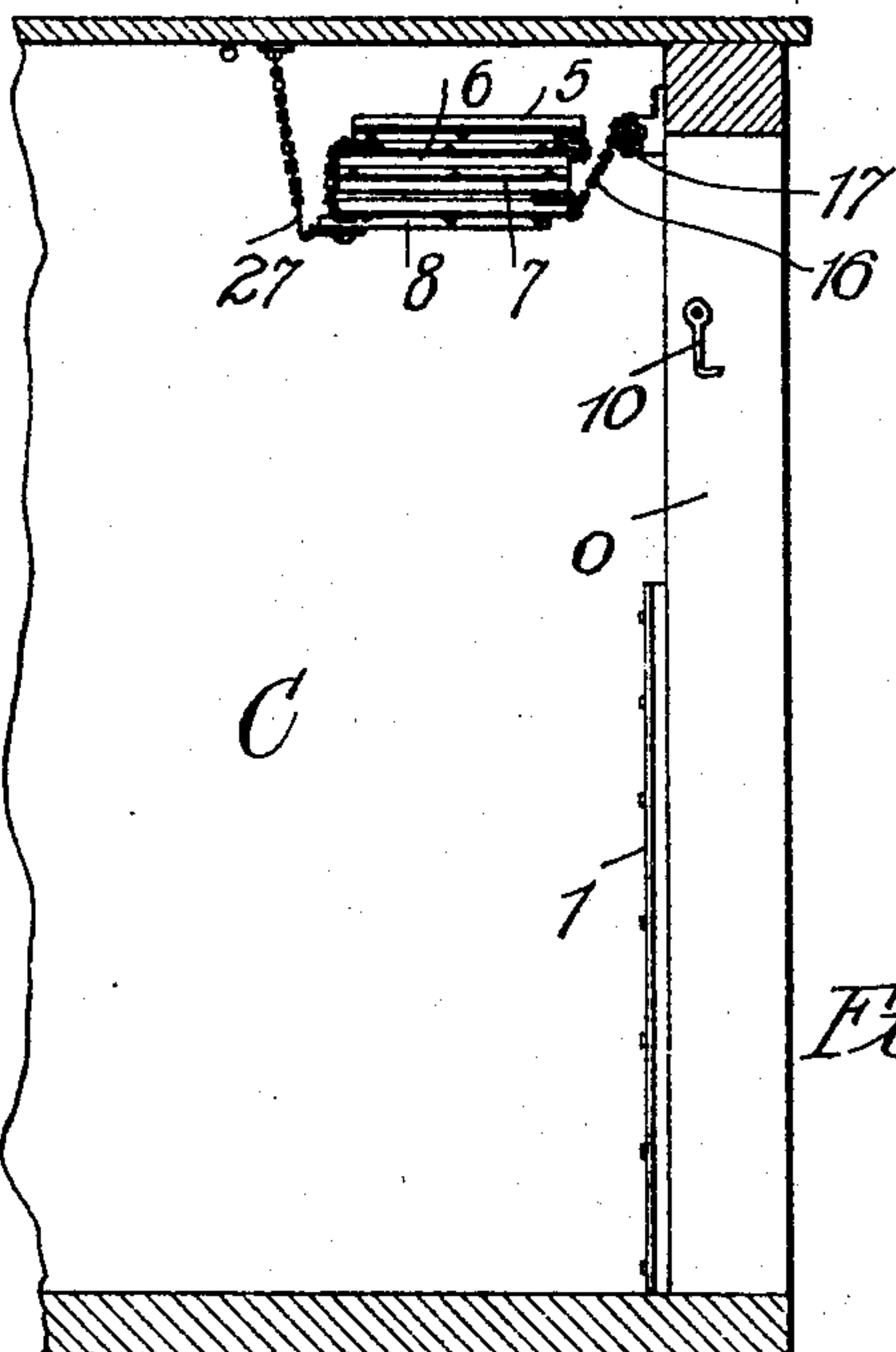
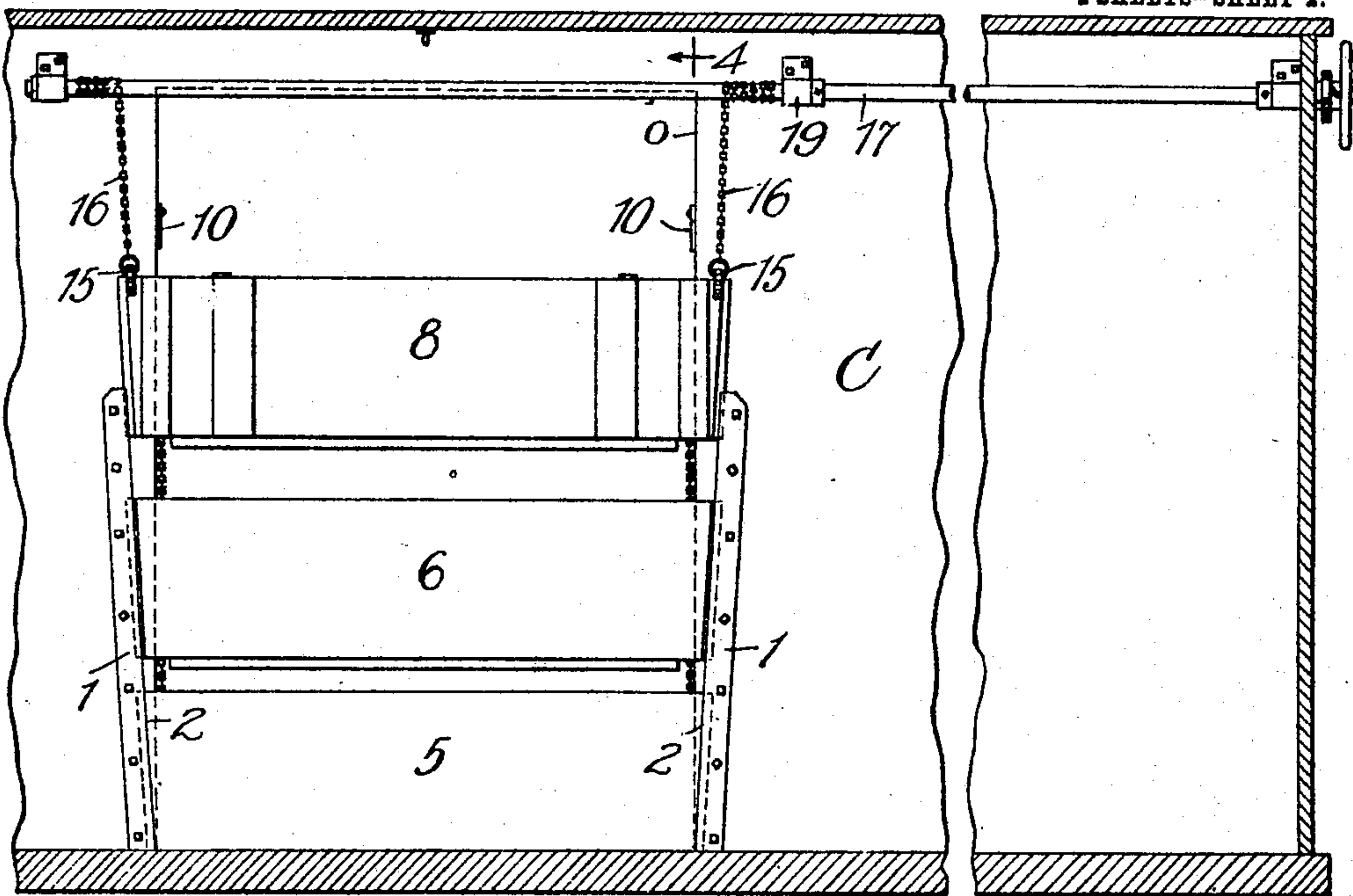
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GRAIN DOOR.

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2 SHEETS—SHEET 2.



Witnesses

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# UNITED STATES PATENT OFFICE.

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GRAIN-DOOR.

951,281.

Specification of Letters Patent.

Patented Mar. 8, 1910.

Application filed October 26, 1908. Serial No. 459,528.

*To all whom it may concern:*

Be it known that I, JOHN A. KING, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Grain-Doors, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to grain doors, particularly to grain doors for railway cars, the object of the invention being to provide improved features of construction and arrangement which will greatly facilitate the manipulation of the door, and which will more efficiently control the flow of grain from the car.

In the present state of the art some grain doors are adapted to be raised and then swung bodily to be suspended in an open position, the door being provided with a relief opening of some kind. The mechanisms for raising the doors of this kind have, however, been extremely crude and inefficient. Furthermore, the raising and swinging of the door to its open position requires considerable labor, and the relief means have been insufficient.

My invention therefore contemplates better and more efficient construction and arrangement by means of which less labor is required to open the door, and to lock it after having opened it. More efficient means are also provided for relieving the pressure of the grain against the door, which also assists in allowing the door to be readily withdrawn from the opening.

The various features of my invention are clearly shown on the accompanying drawings, in which—

Figure 1 is a view of the side of a car showing my improved door in closed position, Fig. 2 is a view of the side of the car taken from the interior, also showing the door in closed position, Fig. 3 is a view similar to that in Fig. 2, showing the door sections separated, Fig. 4 is a section taken on plane 4—4, Fig. 3, the door sections being shown folded together and suspended from the car roof, Fig. 5 is an enlarged view taken on plane 5—5 of Fig. 2, but showing modified door raising mechanism, and Fig. 6 is an enlarged view showing the method of guiding the door sections over the car opening.

The car C has the opening *o* through which the grain or other material flows. Adjacent the vertical edges of the opening *o* I secure guide members 1, whose inner edges 2 diverge upwardly. These guide members may be in the form of plates secured along their rear edges to the car walls with a strip or block 3 inserted under the inner edge so that the front edges of the plates are removed from the car walls to form with said car walls the guiding slots 4, which diverge upwardly. The door for closing and gaging the opening *o* is composed of a plurality of horizontal sections, four sections 5, 6, 7 and 8 being shown. The guiding members 1 are of a length to accommodate only the lower sections 5, 6, and 7 when said sections are together and the door closed. The top section 8 is hinged to the section 7 by suitable hinges 9, and when the door is completely closed, this section 8 is swung upwardly against the car walls and can be held in place by hooks 10. The section 6 is hinged to the section 5 by elongating hinges 11, and to the section 7 by elongating hinges 12, and these hinges may be in the form of chains, as shown. Therefore, if the section 7 is raised, it will first separate from the section 6 by the length of the chains 12, whereupon the section 6 will be separated from the section 5 by the length of the chains 11, and section 5 finally raised from the car floor. As above stated, the upper section 8 when closed is swung upwardly against the car walls. If a car is to be unloaded, the top section 8, after the hooks 10 have been released therefrom, is pushed inwardly, and grain immediately flows around the ends of this upper section, and the pressure against this upper section is gradually relieved so that this section can be swung further inwardly. After the pressure has been sufficiently relieved the section 7 is pulled upwardly by mechanism which will be eventually described, and a further relief opening is afforded between the sections 7 and 6 as the section 7 is raised from section 6. After an interval of flow and upon continuation of upward movement of section 7, section 6 will be raised away from lower section 5, and a third relief opening afforded. The section 5 is then finally raised from the car floor to afford a fourth relief outlet, and as all the door sections are then carried upwardly together, the entire opening *o* is afforded the grain for outlet. With my arrangement, therefore, a plurality of re-



lief outlets are afforded the grain and the pressure against the door gradually relieved, the pressure being considerably relieved from each section before said section is raised and the opening of the door is an easy matter. The top section 8 will, of course, fall down against the section 7, as the grain flows away from the section 8, and the other sections 7, 6, and 5 can be folded together as they reach the top and suspended in such folded position from the car roof to be out of the way.

The door sections can, of course, be of any mechanical construction to give the necessary strength. At the ends of the sections 5, 6, and 7 I apply metallic plates 13, which extend beyond the section edges for engaging in the guideways 4. These metallic plates also extend inwardly a distance beyond the edges of opening *o*, and thus prevent nails being driven through the door sections to secure the sections directly to the car body. Metallic strengthening strips 14 may also be applied to the edges of the upper section 8, and may extend inwardly beyond the opening edges to act as protection against nailing.

At the outside ends of the upper edge of section 7 are pivot members 15, to which one end of chains 16 is pivoted, the other end of the chains being secured to a shaft 17 which extends longitudinally through the car above the opening *o*, the shaft extending to the exterior of the car and terminating there in a hand wheel 18. Bearings 19 are provided at suitable intervals to hold the shaft in alinement. Upon turning of the handwheel 18, the chains will wind up on said shaft, and the door will be lifted.

Suitable locking mechanism, such as a pawl 20 engaging the ratchet 21 on the shaft 17 may be used, this mechanism preventing the door from falling after having been raised.

Instead of the hand wheel at the end of the car, suitable ratchet mechanism could be provided, as shown in Fig. 5. This ratchet mechanism is shown as comprising a handle 22 pivoting a pawl 23 which engages a ratchet wheel 24 on the shaft 17, a suitable detent pawl 25 being also provided. Where the hand wheel is used at the exterior of the car the door might be opened at undesired times by mischievous persons, but where the ratchet mechanism is used, this could not happen as this ratchet mechanism is hidden by the car door 26, which is sealed until the grain is to be removed from the car by authorized persons.

In Fig. 4 is shown how the folded door sections are suspended from the car ceiling. Owing to the diverging guide members 1, the guide plates 13 will clear the inner edges of the guide members after the sections have been raised a short distance, and the various members can then be folded together and

suspended from the car wall, as by means of the hook 27. The upper section 8, of course, folds inwardly against the section 7 and the sections 7, 6, and 5, owing to the chains, can then be folded closely together so that the sections will all form a compact tier, to be locked by the hook 27. When the car is again to be filled, the hook 27 is released and the sections will unfold themselves; the sections 5, 6, and 7 are guided into guide ways 4, and can be readily pushed downwardly to their closed position, the detent pawl being, of course, released from the shaft 17. The upper section 8 is then swung shut, and locked by the hooks 10. The opening *o* can be of sufficient height so that there will be sufficient space above the closed section 8 for the reception of spouts or chutes. To prevent accidental opening of any of the sections due to bumping and jolting during transportation, a hook or hooks 28 may be provided, these hooks being pivoted so that their ends can engage in openings 29 at the edges of the section 7, these hooks thereby serving to lock the sections 5, 6 and 7 in closed position.

A grain door of my construction can be of simpler and lighter construction than doors of the prior art, as the pressure is in greater part relieved from each section of the door before the section is raised. The raising mechanism, therefore, can also be made very much simpler and lighter. As a consequence, much less labor is required to operate the door of my invention. The door can be of plain and simple construction, and there need be no projecting parts. The guide members closely hug the car walls and are, therefore, protected against bumps and pulls which might bend or break them. The wood part of the door does not wear during opening or closing of the door, as the wear and tear is all taken up by the end plates secured to the sections, and which engage the guide members. Changes, however, may be made in the construction which I have shown, which changes would still come within the scope of my invention. I do not, therefore, limit myself to the precise construction, arrangement and operation as shown.

I desire to secure the following claims by Letters Patent:

1. In a grain door mechanism for railway cars, the combination of guide ways adjacent to the car opening to be controlled, a plurality of horizontal sections in the same vertical plane, said sections engaging at their ends in said guide ways and normally in engagement to close the opening, lifting mechanism at the top of the opening, means for connecting said lifting mechanism with the upper section, and elongating coupling members loosely connecting the sections.

2. In a grain door, the combination of a



plurality of horizontal sections normally engaging each other on their edges to form a door for the opening to be covered, said sections tapering inwardly in a downward direction, oblique guide ways on the sides of the lower portions of said openings for engaging the ends of said sections, means for raising the upper section of said door, extensible means loosely connecting said sections, thereby successively forming openings between said sections when they are raised and means for suspending said sections from the roof of the car after said sections have been withdrawn from said guide ways and folded together.

3. In a grain door, the combination of a plurality of solid sections normally abutting on their edges thereby forming a door in a single plane, and normally inactive elongated flexible coupling members secured between said sections.

4. In a grain door, the combination of a plurality of solid horizontal sections normally abutting against each other on their edges, and normally slack elongated flexible coupling members secured between said sections, thereby forming reduced outlet openings when said sections are separated from each other.

5. In combination, a grain compartment having an outlet opening, a door for said opening comprising a plurality of solid horizontal sections having their edges normally in engagement and normally inactive means for connecting adjacent sections thereby limiting the distance said sections can be separated, and lifting means connected with the uppermost of said sections.

6. In combination, a grain compartment having an outlet opening, a guideway at each side of said opening, and a door for said opening comprising a plurality of solid horizontal sections normally in engagement and operating in said guideway and normally slack means for connecting adjacent sections, thereby limiting the distance said sections can be separated to form a reduced outlet opening.

7. In combination, a grain compartment having an outlet opening, a door for said opening comprising a plurality of solid horizontal sections normally in engagement and normally inactive means connecting adjacent sections, thereby limiting the distance

said sections can be separated to form a reduced outlet opening, lifting means connected with the uppermost of said sections, and means for suspending said door above said opening when said door is collapsed through the medium of said connecting means.

8. In combination, a grain compartment having an outlet opening, upwardly diverging guideways on the sides of said opening, a door for said opening comprising a plurality of solid horizontal sections normally in engagement and operating in said guideways and normally slack means for coupling the adjacent sections, thereby limiting the distance said sections can be separated to form a reduced outlet opening, and lifting means connected with the uppermost of said sections whereby said sections may be raised out of said guideways.

9. In a grain door mechanism, the combination of an opening to be closed, a plurality of downwardly tapering sections forming the door, oblique guideways on the sides of said opening for engaging the ends of said sections, lifting mechanism attached to the upper section, flexible means loosely connecting said sections, thereby successively forming openings between said sections when said upper section is lifted, and a supplementary section connected by hinge means to said upper section.

10. In a grain door mechanism, the combination of an opening to be closed, a plurality of downwardly tapering sections forming the door, oblique guideways on the sides of said opening for engaging the ends of said sections, lifting mechanism attached to the upper section, flexible means loosely connecting said sections, thereby successively forming openings between said sections when said upper section is lifted, a supplementary section connected by hinge means to said upper section, metallic strips on the sides of said sections, and means for supporting said sections when they are withdrawn from said guideways, folded together and lifted.

In witness whereof, I hereunto subscribe my name, this 24th day of October, 1908.

JOHN A. KING.

Witnesses:

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