

J. F. STREIB.  
DOOR OPERATING MECHANISM.  
APPLICATION FILED FEB. 3, 1910.

998,929.

Patented July 25, 1911.

5 SHEETS—SHEET 1.

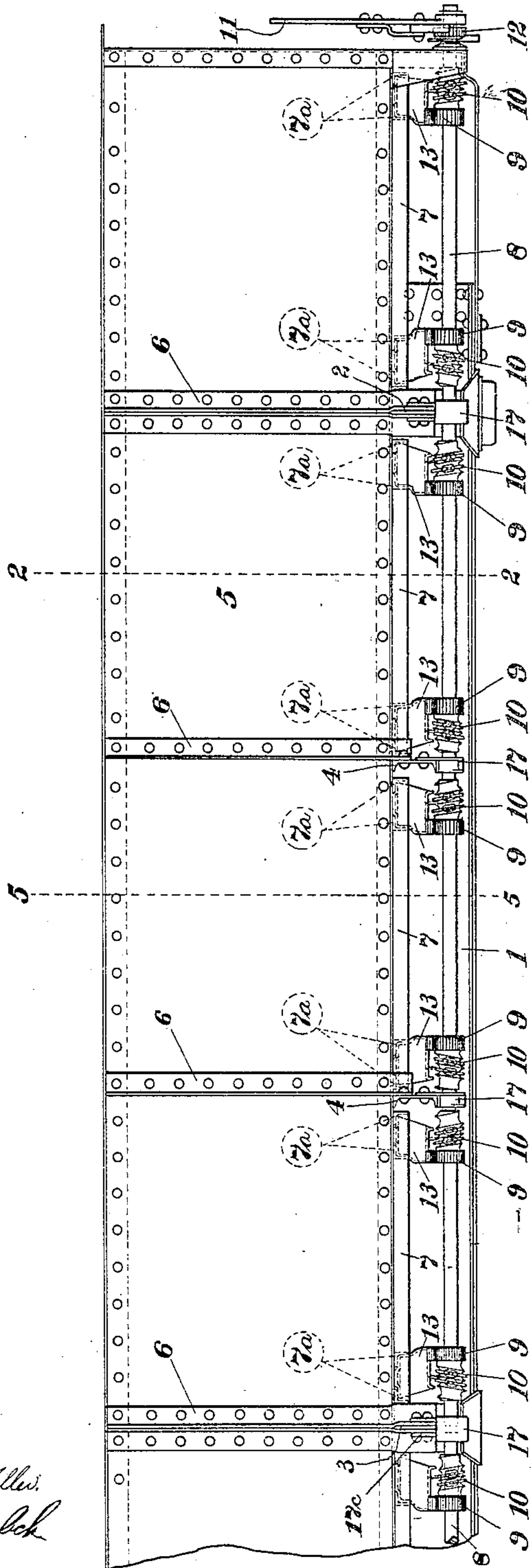


Fig. 1.

Witnesses  
Frank E. Miller.  
Albert Senck

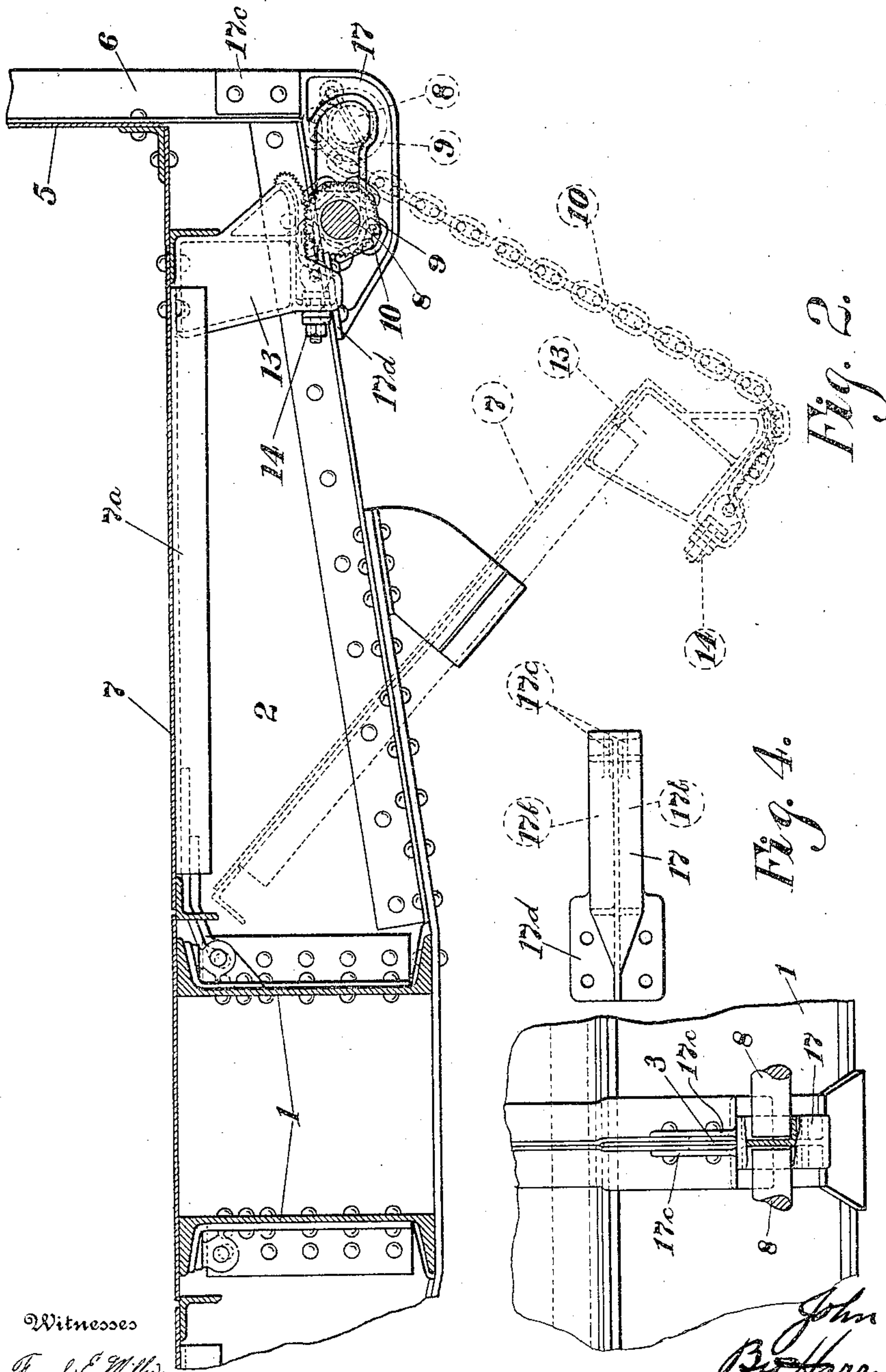
Inventor  
John F. Streib  
By Harry G. Knight  
Attorney

J. F. STREIB.  
DOOR OPERATING MECHANISM.  
APPLICATION FILED FEB. 3, 1910.

998,929.

Patented July 25, 1911.

5 SHEETS—SHEET 2.



Witnesses  
Frank E. Miller  
Albert Senick

Fig. 3.  
Inventor  
John F. Streib  
By Harry G. Knight  
Attorney

J. F. STREIB.  
DOOR OPERATING MECHANISM.  
APPLICATION FILED FEB. 3, 1910.

998,929.

Patented July 25, 1911.

5 SHEETS—SHEET 3.

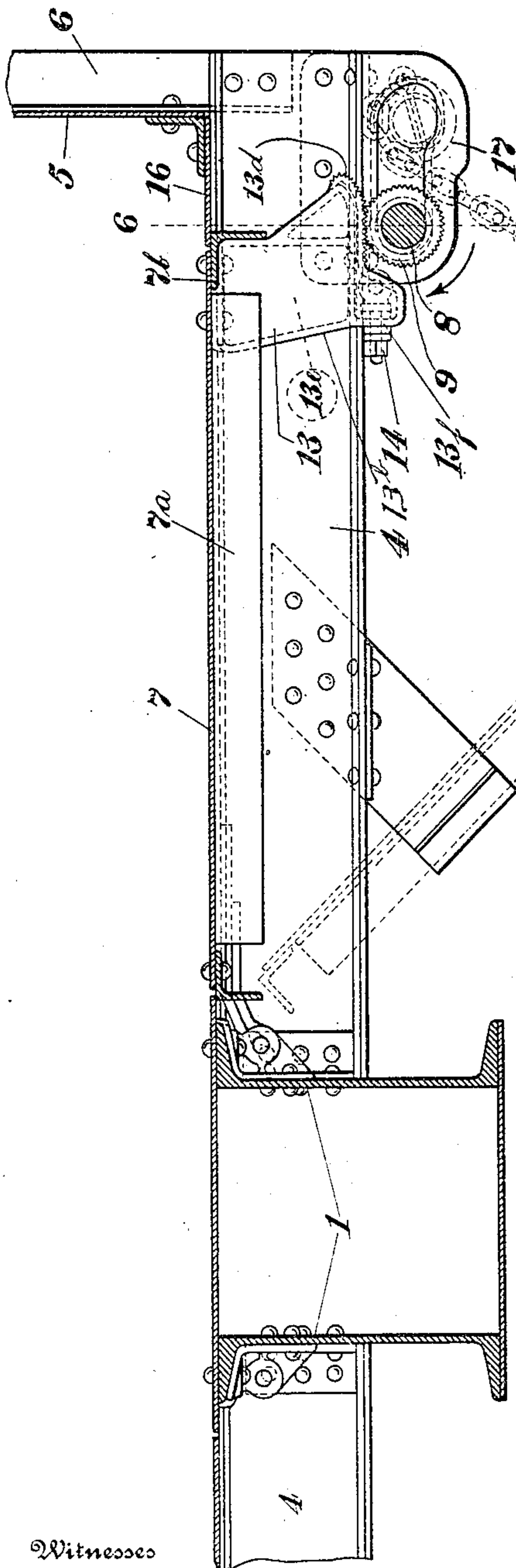


Fig. 5

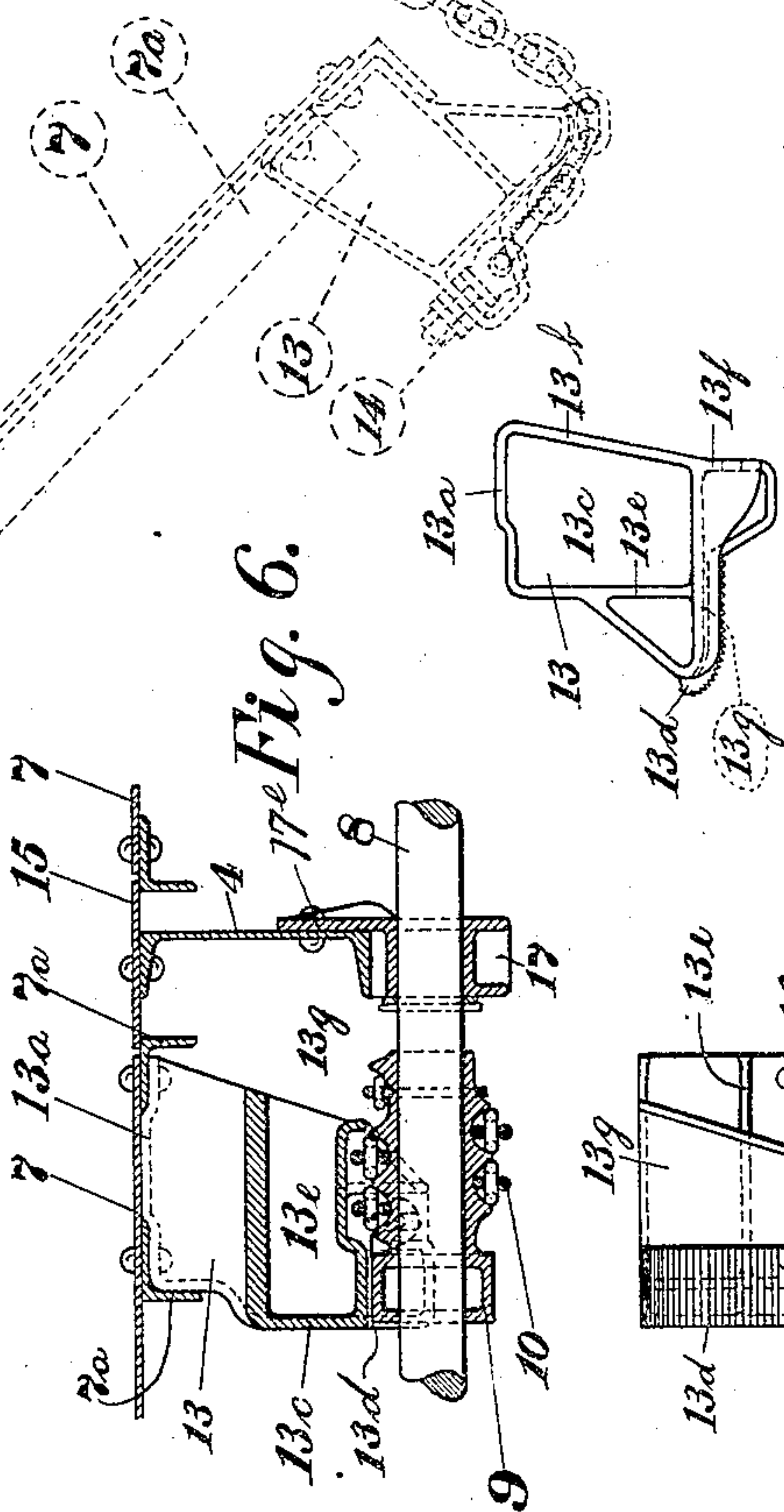


Fig. 6

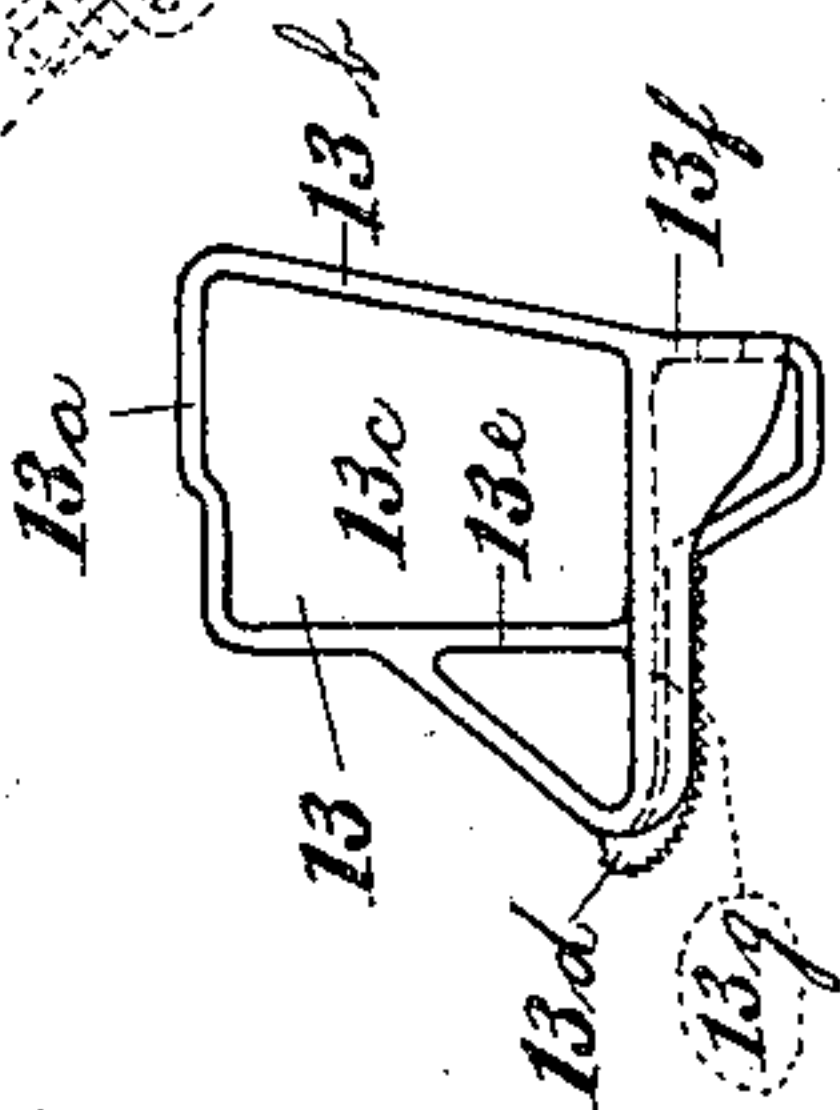


Fig. 7

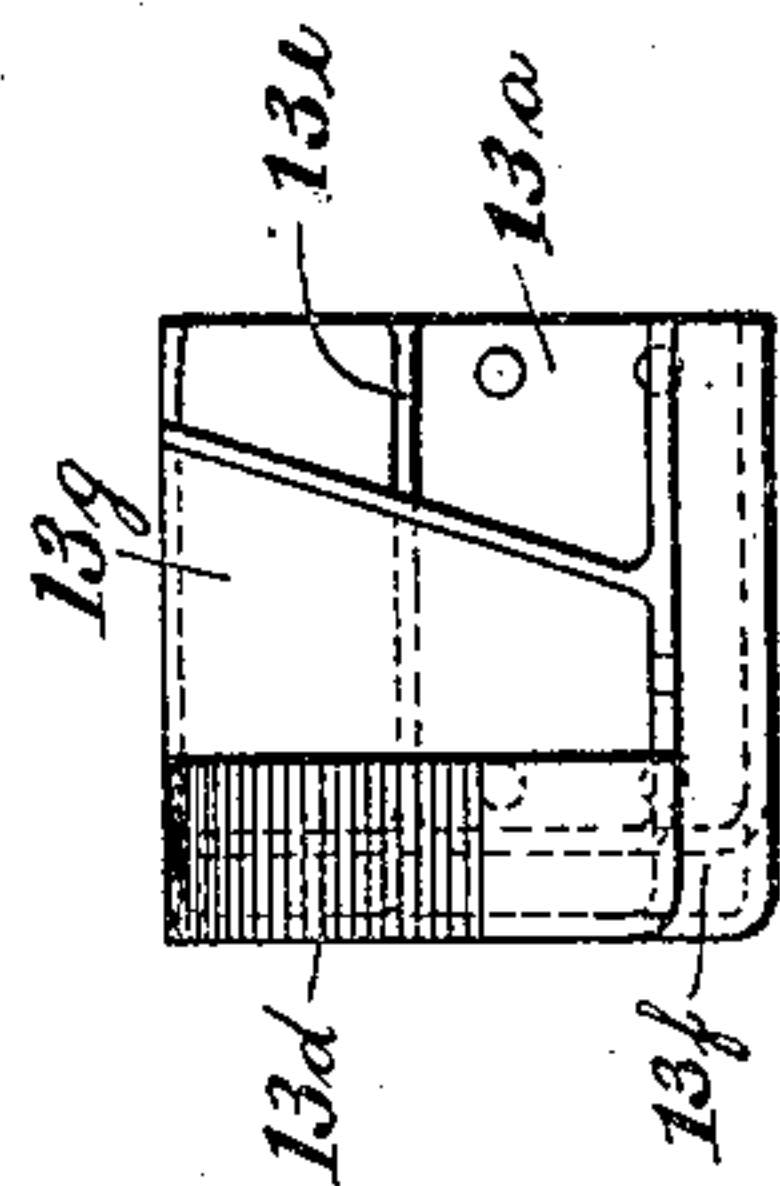


Fig. 8

Witnesses

Frank C. Miller.  
Albert Senick

Inventor  
John F. Streib

By

Harry G. Knight

Attorney



998,929.

Patented July 25, 1911.  
5 SHEETS—SHEET 4.

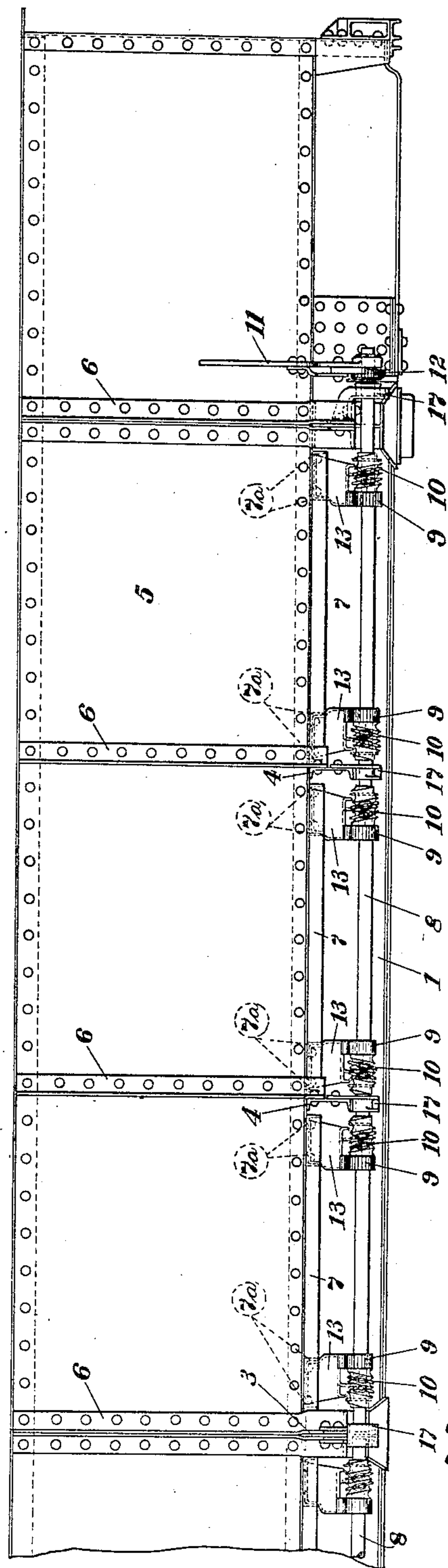


Fig. 9.

Witnesses  
Frank E. Miller.  
Albert Senick

John F. Streib  
By Harry A. Knight

Attorney

J. F. STREIB.  
DOOR OPERATING MECHANISM.  
APPLICATION FILED FEB. 3, 1910.

998,929.

Patented July 25, 1911.

5 SHEETS—SHEET 5.

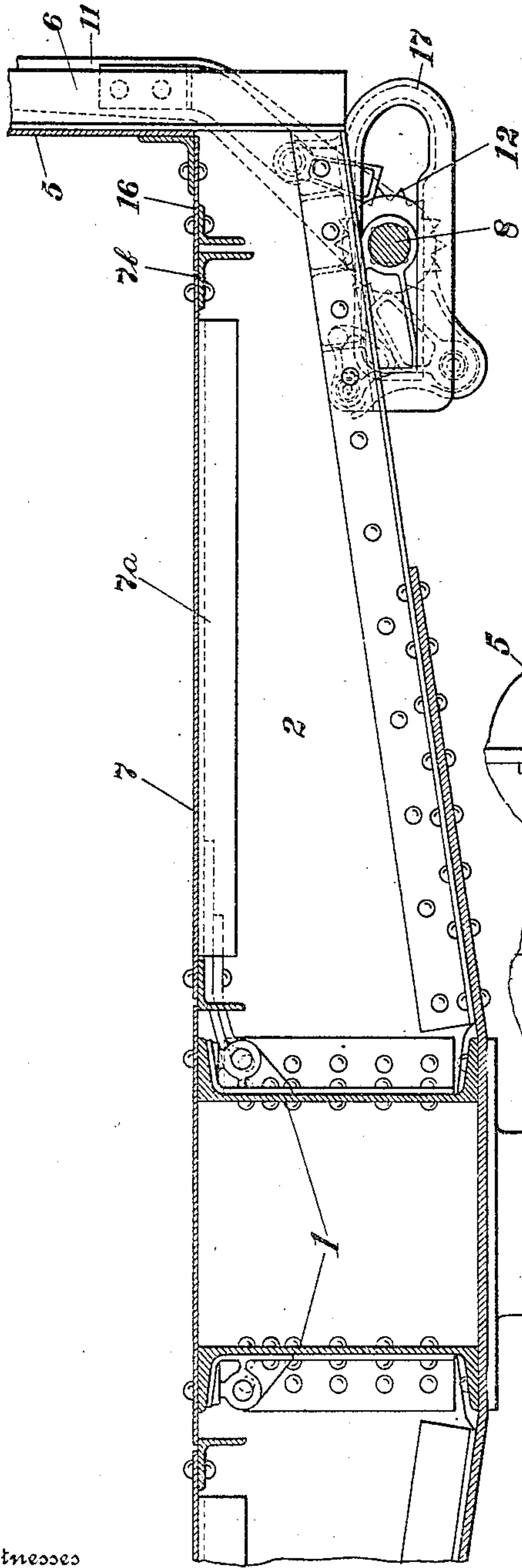


Fig. 10.

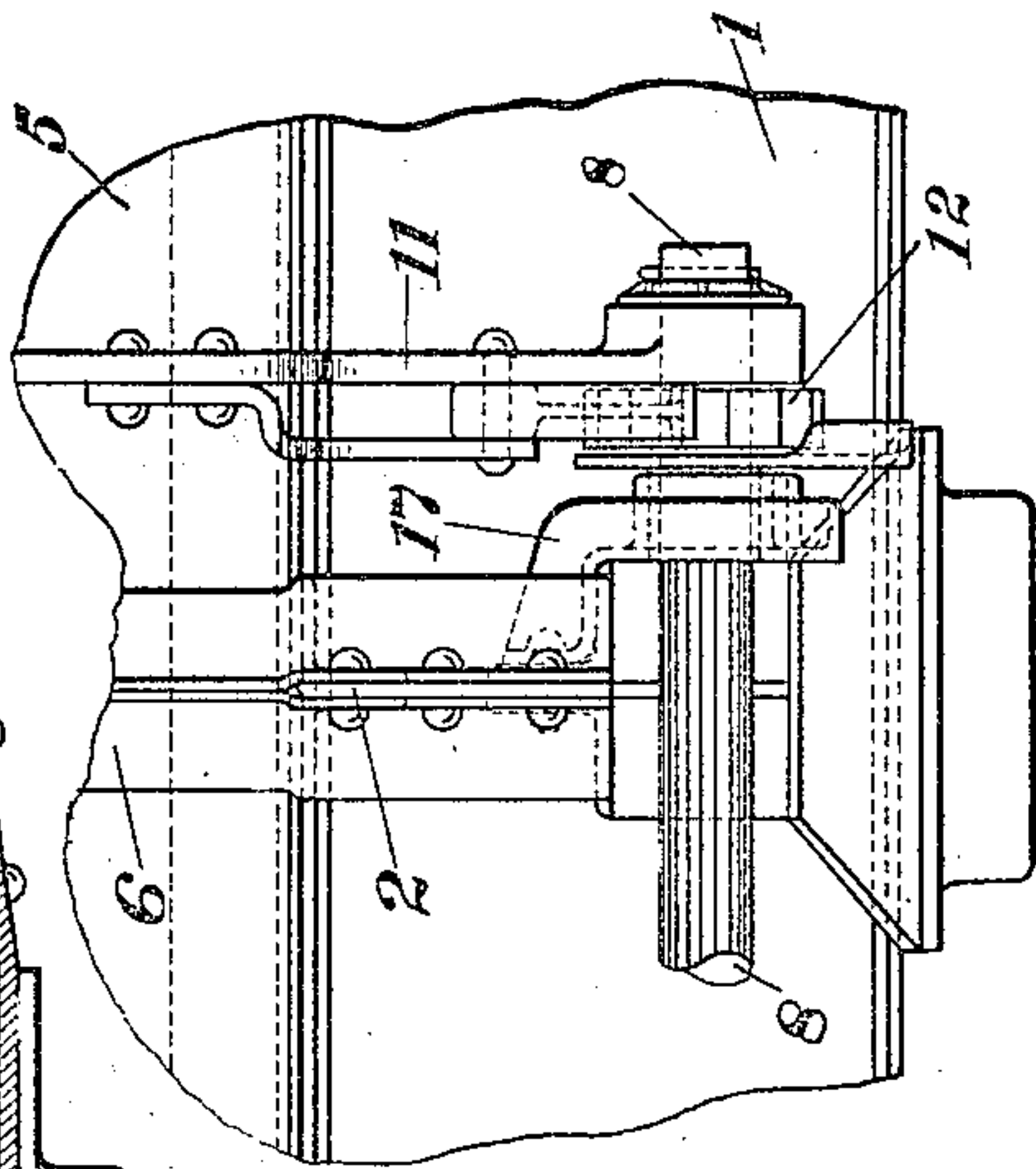


Fig. 11.

Witnesses  
Frank E. Miller.  
Albert Seulich

Inventor  
John F. Streib  
By Harry A. Knight  
Attorney



# UNITED STATES PATENT OFFICE.

JOHN F. STREIB, OF AVALON, PENNSYLVANIA, ASSIGNOR TO PRESSED STEEL CAR COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

## DOOR-OPERATING MECHANISM.

998,929.

Specification of Letters Patent.

Patented July 25, 1911.

Application filed February 3, 1910. Serial No. 541,699.

*To all whom it may concern:*

Be it known that I, JOHN F. STREIB, a citizen of the United States, residing at Avalon, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Door-Operating Mechanism, of which the following is a specification.

An object of the present invention is to provide improvements in that class of car door gear for use in railway cars having drop discharge doors in which means is provided for raising said doors which means, after raising the doors, supports them directly to relieve the connection between the door-raising means and the door from strain.

Specifically stated, my invention relates to that class of door operating and supporting mechanism which is shown and described in United States Letters Patent No. 791,348, issued May 30th, 1905, to C. A. Lindstrom and myself, and United States Letters Patent No. 833,402, issued October 16, 1906, to C. A. Lindstrom. In the mechanism of both of these patents, chain means is employed for raising the doors and a creeping shaft is employed for first winding said chain means and then supporting the doors in raised position directly on the shaft, and not through the medium of the chain means, to relieve the chain means from load strain.

The herein described invention relates to any railway dump car door operating mechanism which involves a bodily movable shaft for supporting drop doors in closed position and has for a specific object to provide a means whereby such a shaft may be readily applied to a dump car either at the time the car is built or subsequently thereto.

A further object of the present invention is to provide a mechanism comprising detailed improvements in the type of mechanism above described, so that a more direct pull will be exerted on the lifting chain during the closing movement of the door and so that the chain is caused to wind more evenly upon the translation of the bodily movable

shaft to its final door-supporting position and, furthermore, to provide improvements whereby such a mechanism may be applied to a dump car without the necessity of cutting the diaphragms or cross-bearers of the car to form the shaft bearings therein. An important advantage of the structure of the present invention is, however, that it enables the application of a door operating gear, such as is illustrated in the two aforesaid patents, to a car formerly equipped with some other type of door mechanism which has proven unserviceable.

With the mechanism herein shown and described, and forming the subject-matter of the present invention, the complete mechanism is separate and distinct from the structure of the car proper, and such invention is fully described in the following specification and shown in the accompanying drawings in which like reference characters refer to like parts, and in which—

Figure 1 is a side elevation of about one-half of a railway car, of the gondola type equipped with a structure of the invention and in which the door-operating shaft runs from the end sill of the car to the middle portion of the car; Fig. 2 is a transverse section showing slightly over one-half of a car transversely on the line 2—2, Fig. 1; Fig. 3 is a detail side view of the central shaft supporting bracket, bearing or hanger; Fig. 4 is a detail bottom plan view of the same; Fig. 5 is a view similar to Fig. 2 but on the line 5—5, Fig. 1; Fig. 6 is a longitudinal detail sectional view on the line 6—6, Fig. 5; Fig. 7 is a detail bottom plan view of one of the door shoes; Fig. 8 is a detail side elevation of the same; Fig. 9 is a view similar to Fig. 1 showing a shaft extending only from the car bolster to the middle portion of the car; Fig. 10 is a view similar to Fig. 2 showing the structure of Fig. 9, and Fig. 11 is a slightly enlarged detail side elevation illustrating the outer end of the shaft and its supporting bracket shown in Fig. 9.

Referring now in detail to the drawings,



1 represents the center sills of a car, 2 the car bolster, 3 the deep intermediate cross-bearers, 4 the shallow intermediate cross-bearers, 5 the car side wall or sheeting, 6 the car stakes, 7 the dump door's pivoted between the several cross-bearers 2, 3 and 4, and 8 the door-operating shaft.

9 is the combined chain-winding sheave and shoe supporting collar, and 10 is a door-raising chain which winds about the collar or sheave 9.

11 is the shaft-operating lever suitably mounted on and adapted to travel with the shaft 8, and 12 is any suitable form of pawl and ratchet mechanism mounted on shaft 8 and coöperating with the lever 11 to turn shaft 8.

All of the foregoing parts are present in previous constructions.

20 For the purpose of applying the foregoing parts of the door-operating mechanism to the car without modifying in any way the shape of such mechanism, shoes 13 and slotted shaft supporting brackets, bearings or hangers, hereinafter described, are provided. Shoes 13, of substantially the same depth as cross-bearers 2, 3 and 4 at their outer ends, are riveted or otherwise secured to the under surface of doors 7 at the forward or free edges of said doors. Shoes 13 are provided with lateral horizontal upper faces or extensions 13<sup>a</sup> (Figs. 6 and 7) for the purpose of securing them to doors 7. Shoes 13 are furthermore provided with substantially perpendicular rear faces 13<sup>b</sup>, substantially perpendicular sides 13<sup>c</sup>, projecting serrated noses 13<sup>d</sup> (Figs. 5, 7 and 8), an intermediate perpendicular transverse strengthening rib 13<sup>e</sup> just back of nose 13<sup>d</sup>. The surfaces and flanges, thus described, make shoes 13 hollow boxlike structures each with one side open, strong in proportion to their weight and well adapted to the work for which they are intended. Shoes 13 also form points of attachment for the chains 10 to door 7, each of shoes 13 being provided at the rear with a depending flange 13<sup>f</sup> beneath its rear face 13<sup>b</sup> and perforated to receive an eye-bolt 14 to which the door end of chain 10 is secured. As guides to chains 10, each of shoes 13 is also provided with a channel or guide-ways 13<sup>g</sup> formed in the under surface of shoe 13. Channel or guide-ways 13<sup>g</sup> are wedge-shaped, the narrowed portions of said channel or guide-ways 13<sup>g</sup> being at the points of attachment of chains 10 to shoes 13. The function of these guide or channel-ways 13<sup>g</sup> is to maintain the chains 10 in line so that when the doors are dropped the chains will not slip off the sides of the shoes 13 and thus interfere with the lifting of the door to an extent sufficient to allow the door shaft 8 to

ride under the shoe 13. Shoe 13 is also rounded on its under side beneath nose 13<sup>d</sup> to form a bearing for chain 10 at the point where it bends toward the shaft 8. Shoes 13 and the serrated rollers on combined collars and sheaves 9 form bearings for the shaft 8 under the door 7.

Door 7 is reinforced and braced longitudinally by angles 7<sup>a</sup> arranged in two pairs, respectively, angles 7<sup>a</sup> of each pair being spaced apart a distance equal to the width of a shoe 13 to receive a shoe 13 therebetween at or near the forward edge of the door 7, each of the shoes 13 occupying such a position that its nose 13<sup>d</sup> projects outwardly beyond the free edge of the door 7. It will thus be seen that each of the doors 7 is reinforced longitudinally in direct lines with the shoes on the under side of the door, two of the several angles on each door constituting the side edges of the door which are adapted to bear against the cover plate 15 of the cross-bearers 2, 3 and 4.

In addition to angles 7<sup>a</sup>, the free edge of the door is provided with an angle 7<sup>b</sup> which stiffens the door along its free edge and counteracts the warping tendency. Angle 7<sup>b</sup> also constitutes the free edge of the door and bears against the edge strip 16 of the car floor.

In order to support the bodily movable shaft in slotted bearings in such a manner that it will be unnecessary to alter or change the construction of the car proper, and so that the mechanism herein described may be applied to any existing car, slotted shaft-supporting brackets, hangers or bearings 17 are provided, each of which has a bearing recess or slot 17<sup>a</sup> to receive and guide the shaft in its translation bodily. There are three distinct forms of these brackets, hangers or bearings 17 shown in Figs. 1 to 8, inclusive, these three forms differing in details to adapt them to the shape of the particular cross-bearer on which they are mounted, and one of said brackets, hangers or bearings 17 differing further from the others in that it is provided with two shaft guide recesses 17<sup>b</sup> separated by a central wall or partition to adapt it to act as a bearing for the adjacent ends of the two operating shafts 8 on one side of the car. This particular form of bracket, hanger or bearing 17 is shown in Figs. 3 and 4.

Brackets 17, which are secured to the cross-bearers 2 and 3, are each provided with separated and upwardly projecting securing lugs 17<sup>c</sup> through means of which they are secured to stakes 6. Brackets, hangers or bearings 17, secured to cross-bearers 2 and 3, are also each provided with an inclined upper surface and laterally projecting lugs or flanges 17<sup>d</sup> by means of which they are se-



cured to the under surfaces of the cross-bearers 2 and 3. Brackets, hangers or bearings 17, which are secured to the cross-bearers 4, are provided simply with upwardly projecting flanges 17<sup>a</sup> through means of which they are secured to the webs of the cross-bearers 4. The brackets, bearings or hangers 17, which are secured to the cross-bearers 2 and 4; are provided with guide slots which extend through said brackets, hangers or bearings. The common attributes, however, of all the brackets, hangers or bearings 17 are that they form elongated bearings for the bodily movable shaft and are all secured to the car underframe or cross-bearers without, in any way, modifying the construction of such underframe.

In the structure shown in Figs. 1 to 8, inclusive, the door-operating shaft extends approximately one-half the length of the car. In the structure shown in Figs. 9 to 11, inclusive, the door-operating shaft extends only from the car bolster or cross-bearer 2 to approximately the center of the car. There is one further difference between the structure shown in Figs. 1 to 8, inclusive, to the structure shown in Figs. 9 to 11, inclusive, which is the shape of the bracket, hanger or bearing 17 mounted on the cross-bearer 2 in Figs. 9 to 11, inclusive, this bracket being riveted to the web of the cross-bearer or bolster 2, projecting outwardly and then downwardly to support the outer end of the shaft 8.

The operation of the mechanism is the same whether it is made in accordance with Figs. 1 to 8, inclusive, or whether it is made in accordance with Figs. 9 to 11, inclusive. In each case, assuming the doors to be open, the operating lever 11 is moved away from the car and back a number of times, rotating the shaft 8 in the direction of the arrow in Fig. 5, winding the chain over the shaft and drawing the door up to a position where the nose 13<sup>d</sup> of the shoe 13 is approximately in the plane of the upper surface of the combined chain winding sheave and shaft supporting collar, whereupon continued rotation will, through the further winding of the chain on shaft 8, force shaft 8 to creep beneath shoe 13, thereby creating a final wedging action of the door against the edge strip 16, so that the same is closed very tightly.

The operation of the mechanism has already been described in the patents previously herein referred to and does not constitute the present invention which consists in the peculiar shaping of the several parts of the mechanism which makes it possible to apply the general type of mechanism to any car having a drop door, for it is obvious

that the shapes of the shoes 13 and the brackets, hangers or bearings 17 may be so modified as to suit the particular shapes of the drop doors of a car, or the shafts, or depths of the cross-bearers, respectively, to which they are applied, such shoes and brackets, hangers or bearings being the only parts in the mechanism which require special shaping or construction, the remaining parts being standard. Hence it will be seen that expensive application of this general type of door gear to a car, whether a new or an old car, may be maintained at the minimum. It is obvious that the shoes and the the winding sheaves or collars may be of any suitable shape to accomplish other advantageous results, provided they are of sufficient dimension to compensate for the depth of the cross-bearers in a car, so that the creeping shaft in the mechanism may be mounted below such cross-bearers.

While in Fig. 1 the door-raising shaft 7 is shown as extending through the end sill of the car, in which case, of course, it will be necessary to cut the end sill of the car to form a slotted bearing therein, it is obvious that this would not be necessary in all cases, as frequently end sills are employed on cars which are not of greater depth than the cross-bearers of the car.

It will be appreciated that the mechanism herein shown and described is separate and distinct from the car construction and, even if applied to a car when new, it involves less expense than if bearings were formed in the several cross-bearers, as has been done heretofore.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a dump car, the combination with a drop door, a shaft and a chain for raising said door, of a casting projecting from the free edge of said door and having a flaring chain-guiding channel formed in its under surface, said chain connecting the shaft and casting and being adapted to play in said channel.

2. In a dump car, the combination with the underframe, a drop door hinged therein, and a bodily movable shaft for first raising said door and then moving into position to directly support the door, of a shaft bracket having a slot formed therein for the shaft and upwardly projecting securing flanges secured to the underframe.

3. In a dump car, the combination with the underframe, a drop door hinged therein, and a bodily movable shaft for first raising said door and then moving into a position to directly support the door, of a slotted shaft-supporting bracket mounted beneath the underframe and provided with an offset up-



wardly projecting securing flange secured to the underframe.

4. In a dump car, the combination with the underframe, a drop door hinged therein,  
5 and a bodily movable shaft for first raising said door and then moving into a position to directly support the door, of a slotted shaft-supporting bracket mounted beneath the underframe and provided with upwardly pro-

jecting securing flanges embracing and secured to a portion of the underframe. 10

In testimony whereof I affix my signature in presence of two witnesses.

JOHN F. STREIB.

Witnesses:

G. C. LAMBE,  
G. M. AGNEW.