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3 SHEETS—SHEET 1.

Fig. 1.

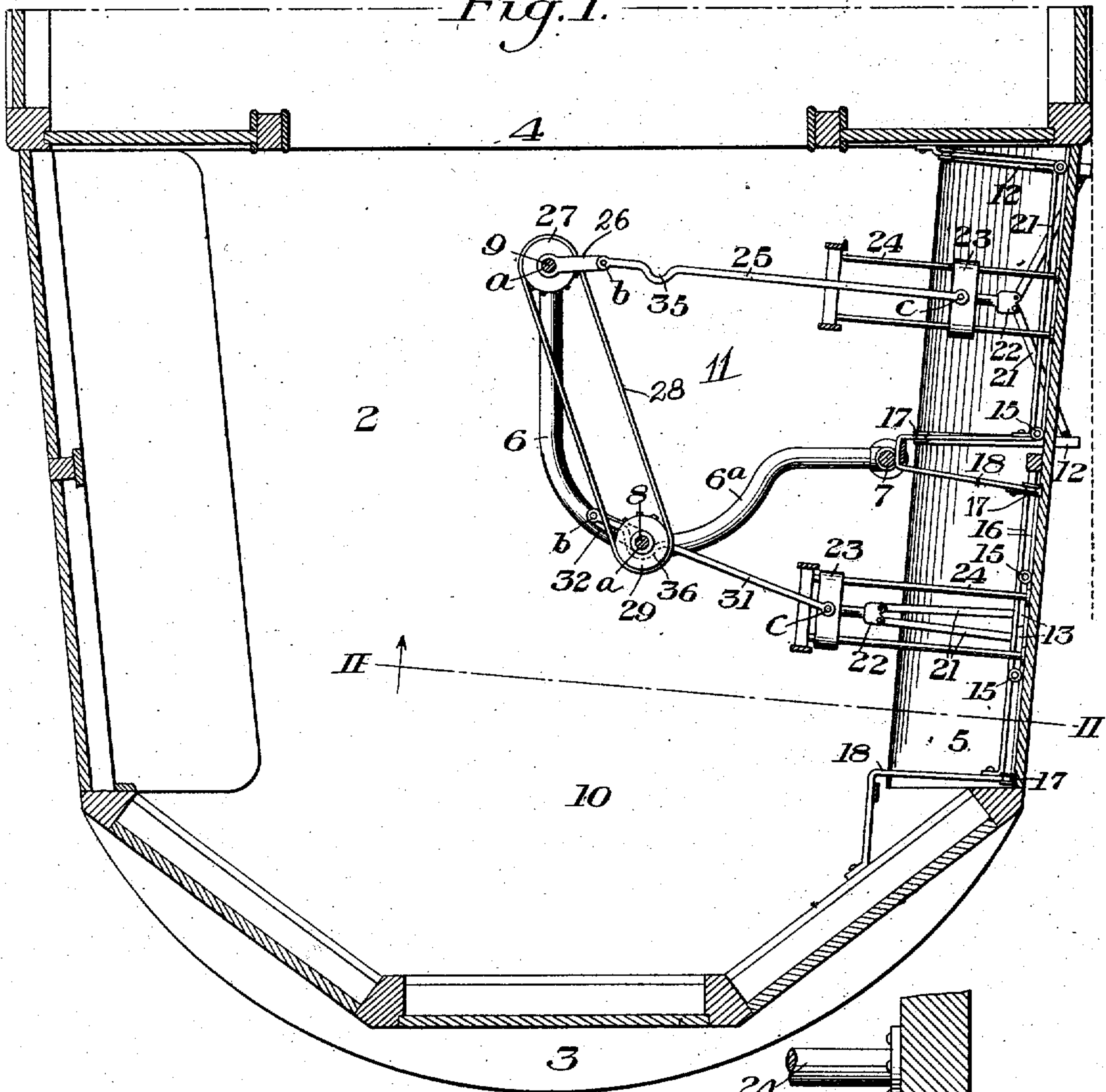


Fig. 3.

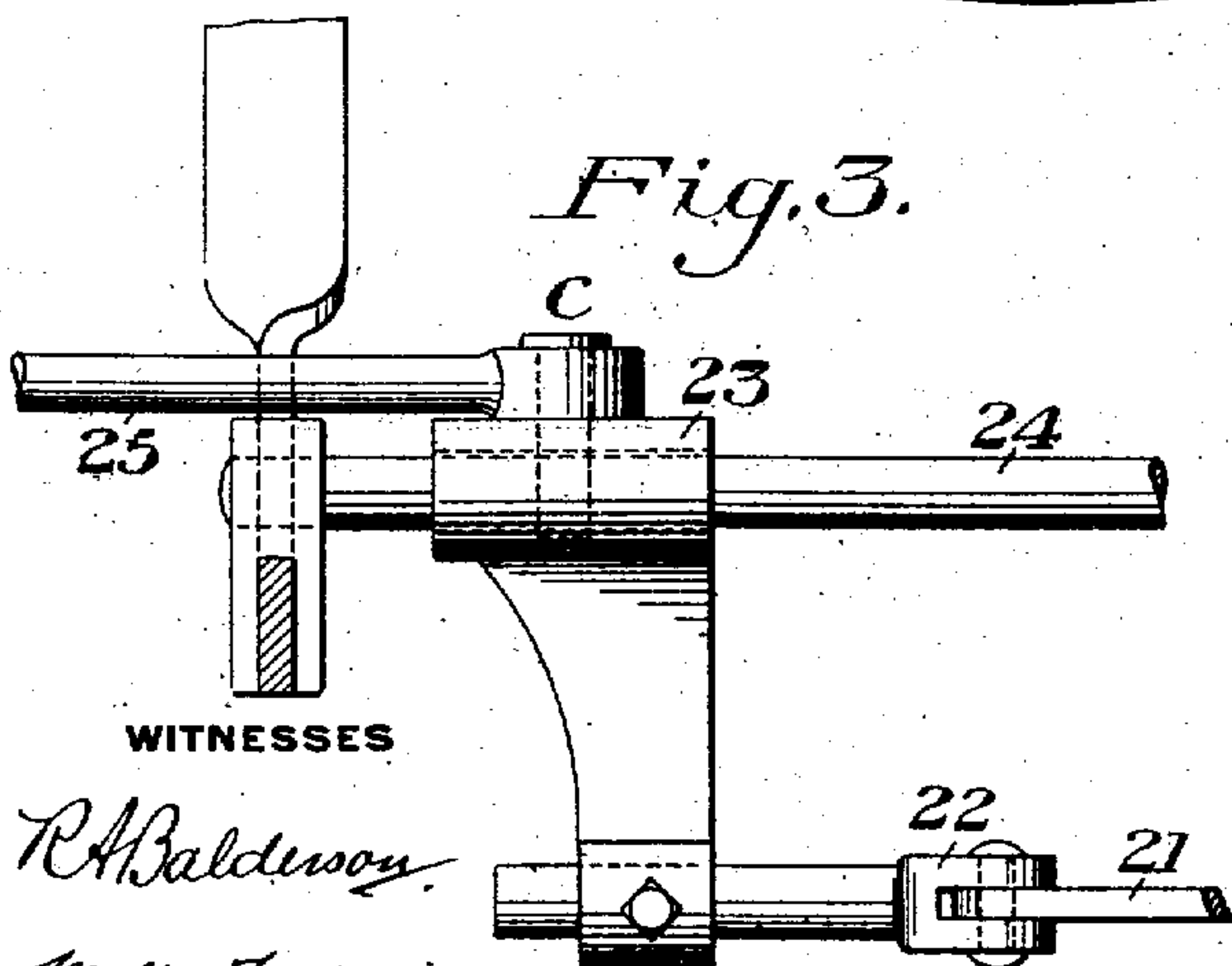
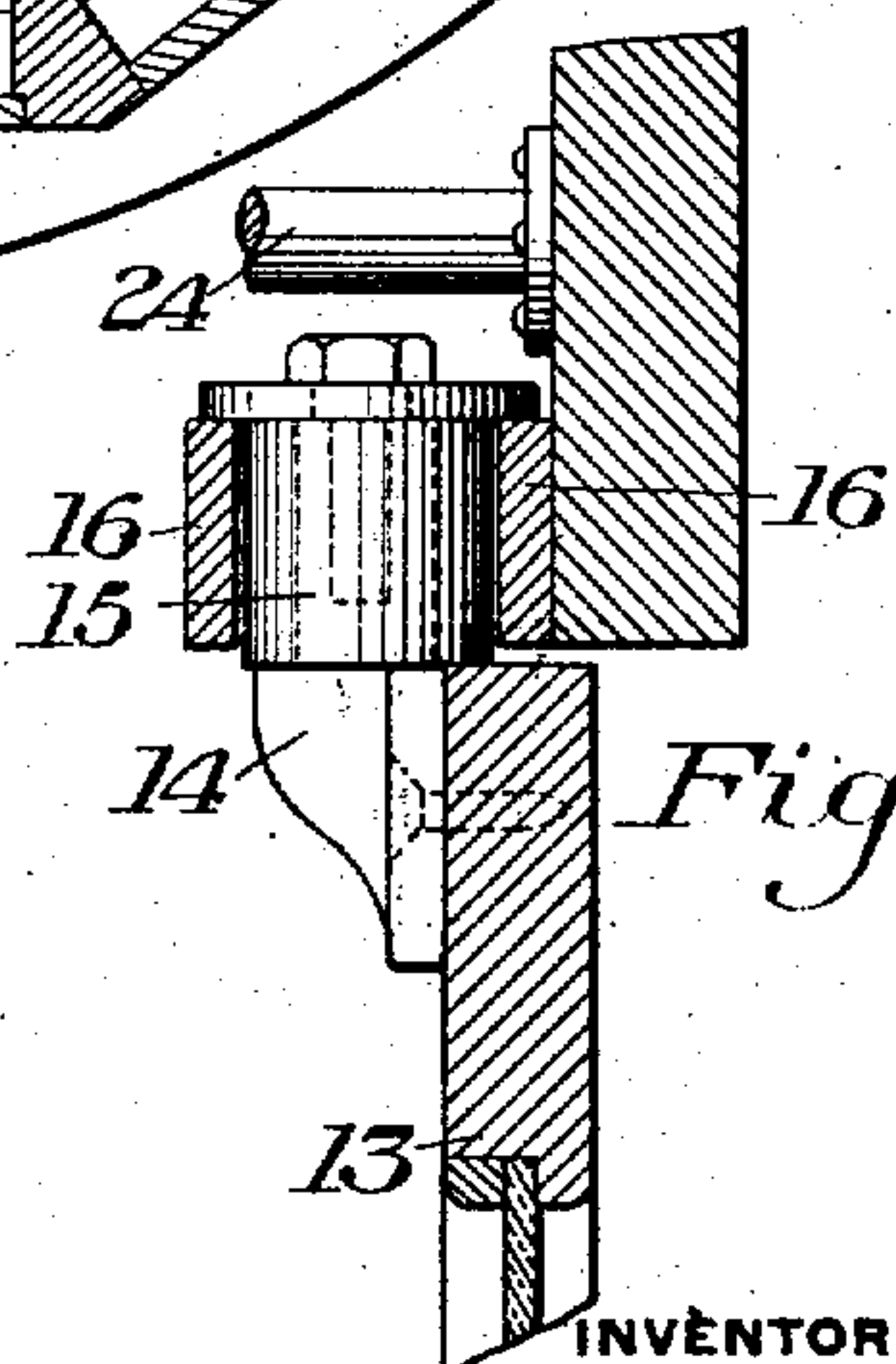


Fig. 4.



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DOOR OPERATING MECHANISM FOR PASSENGER CARS.

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Fig. 5.

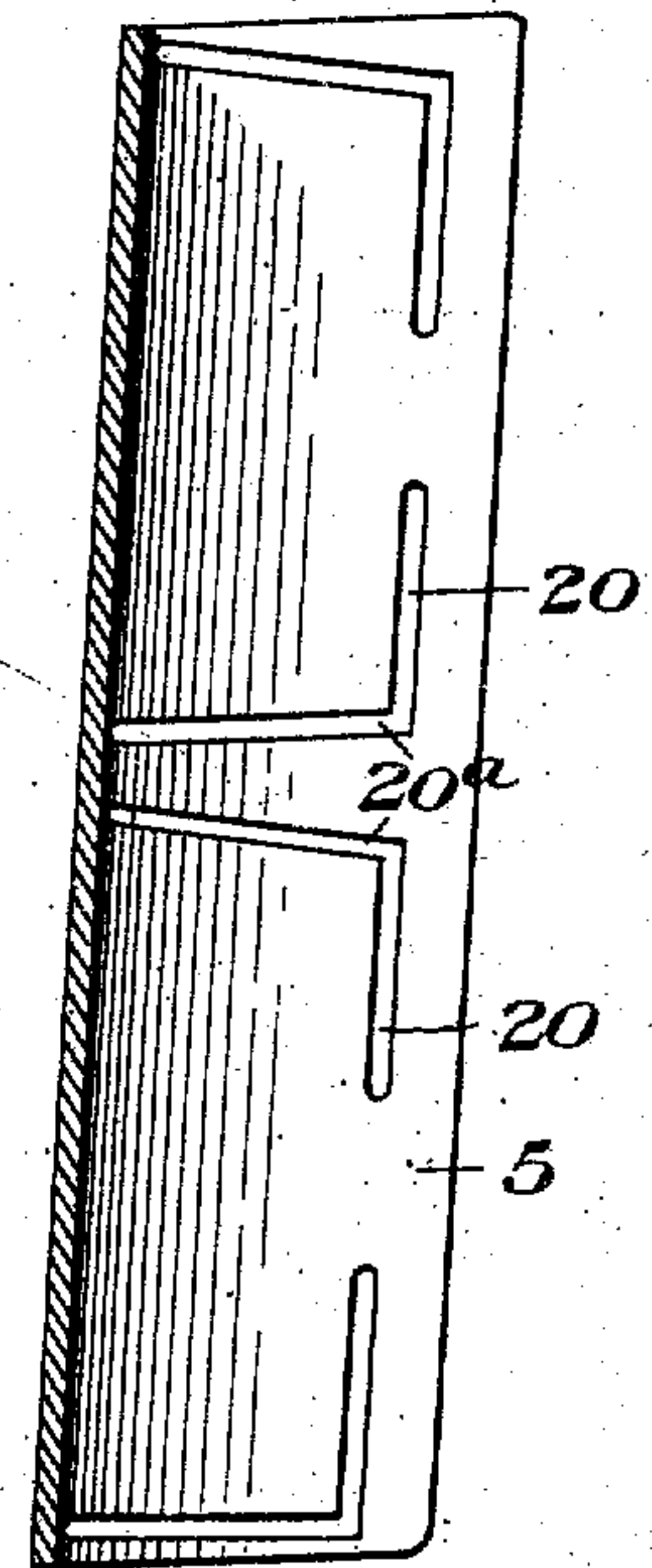
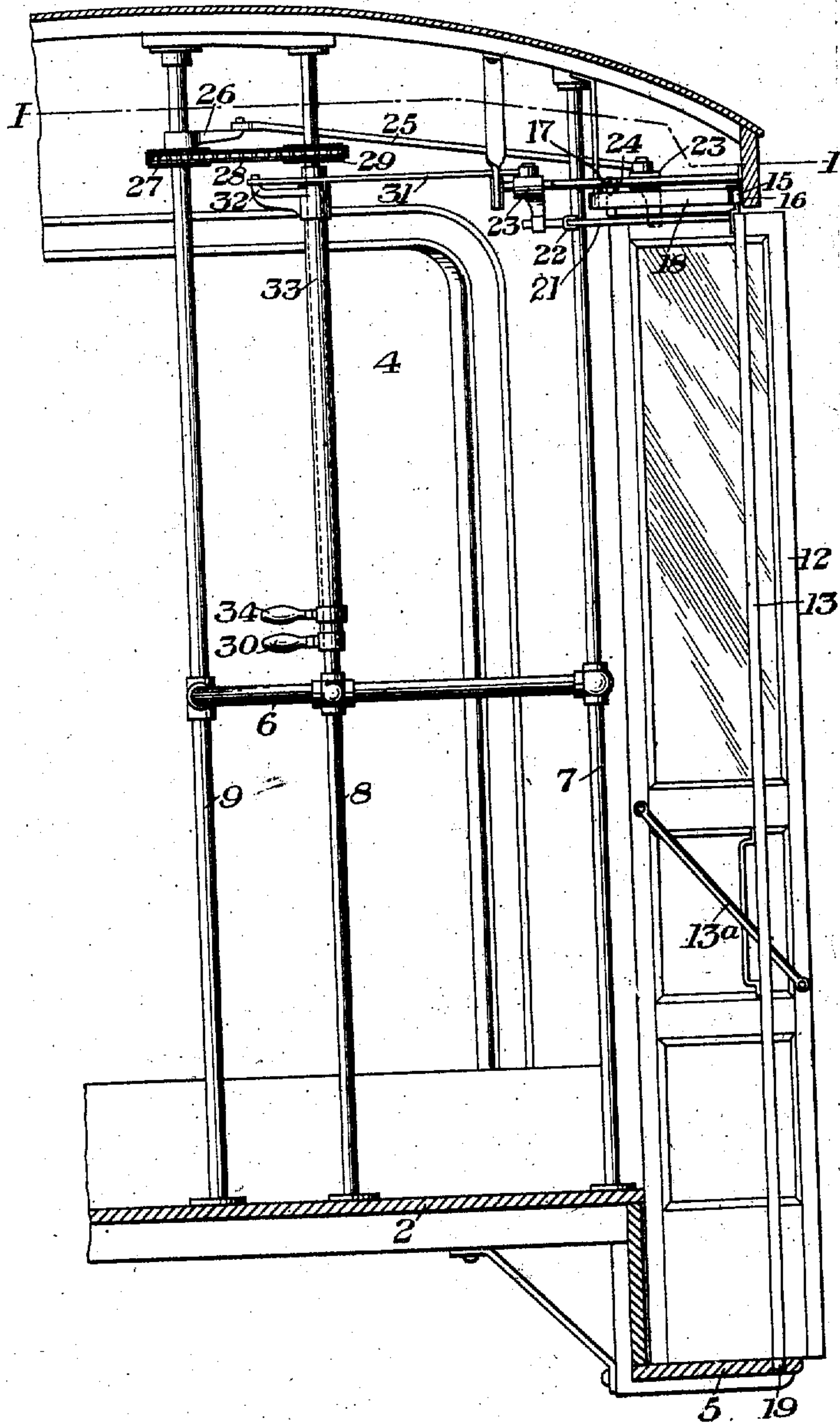
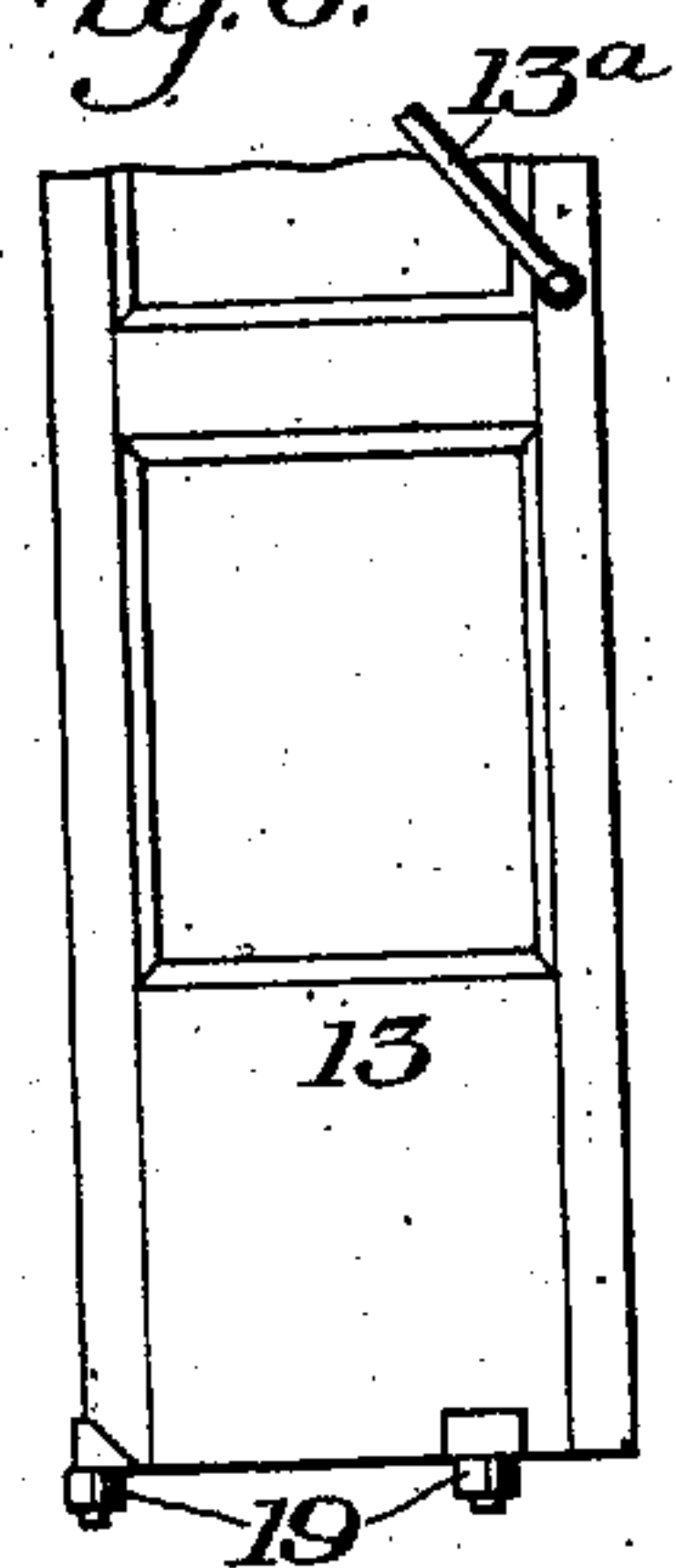


Fig. 6.



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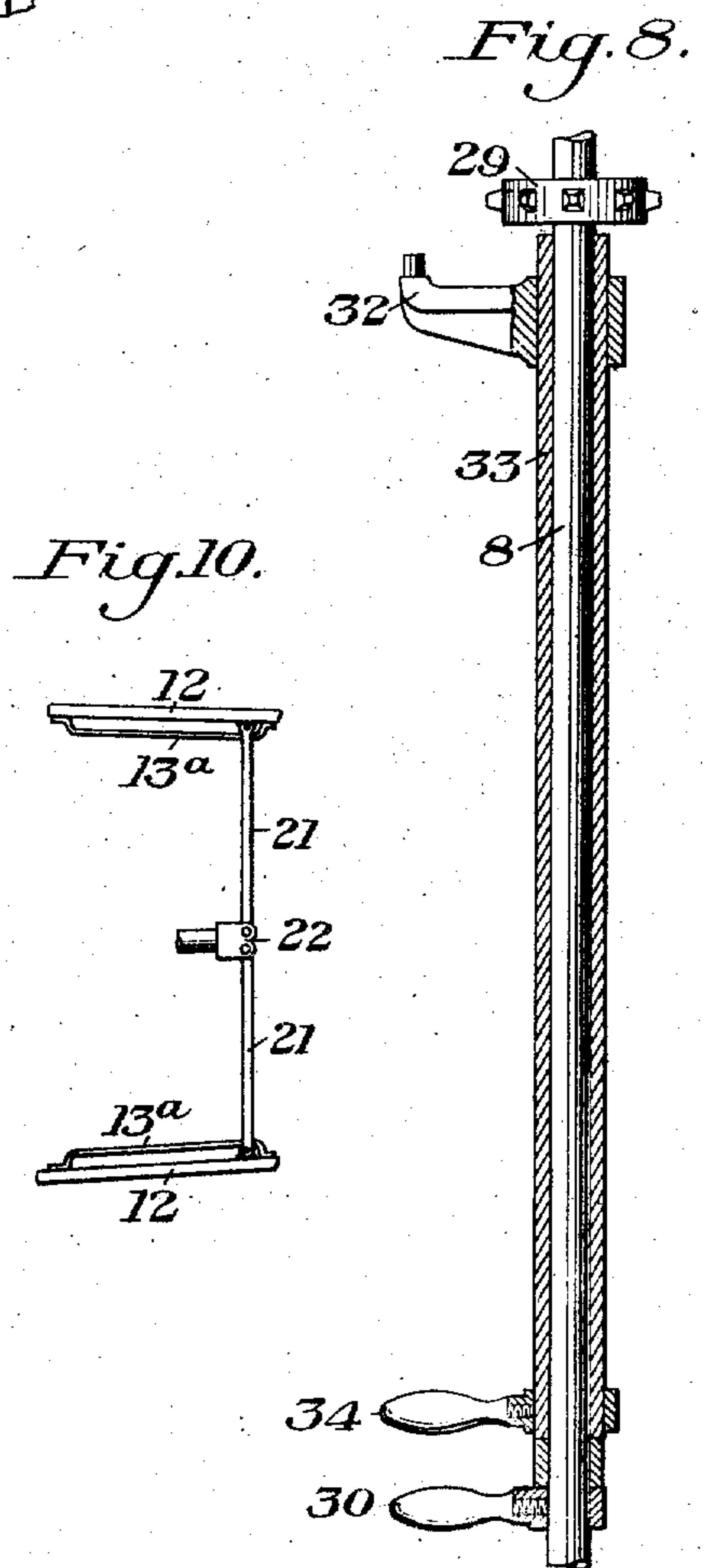
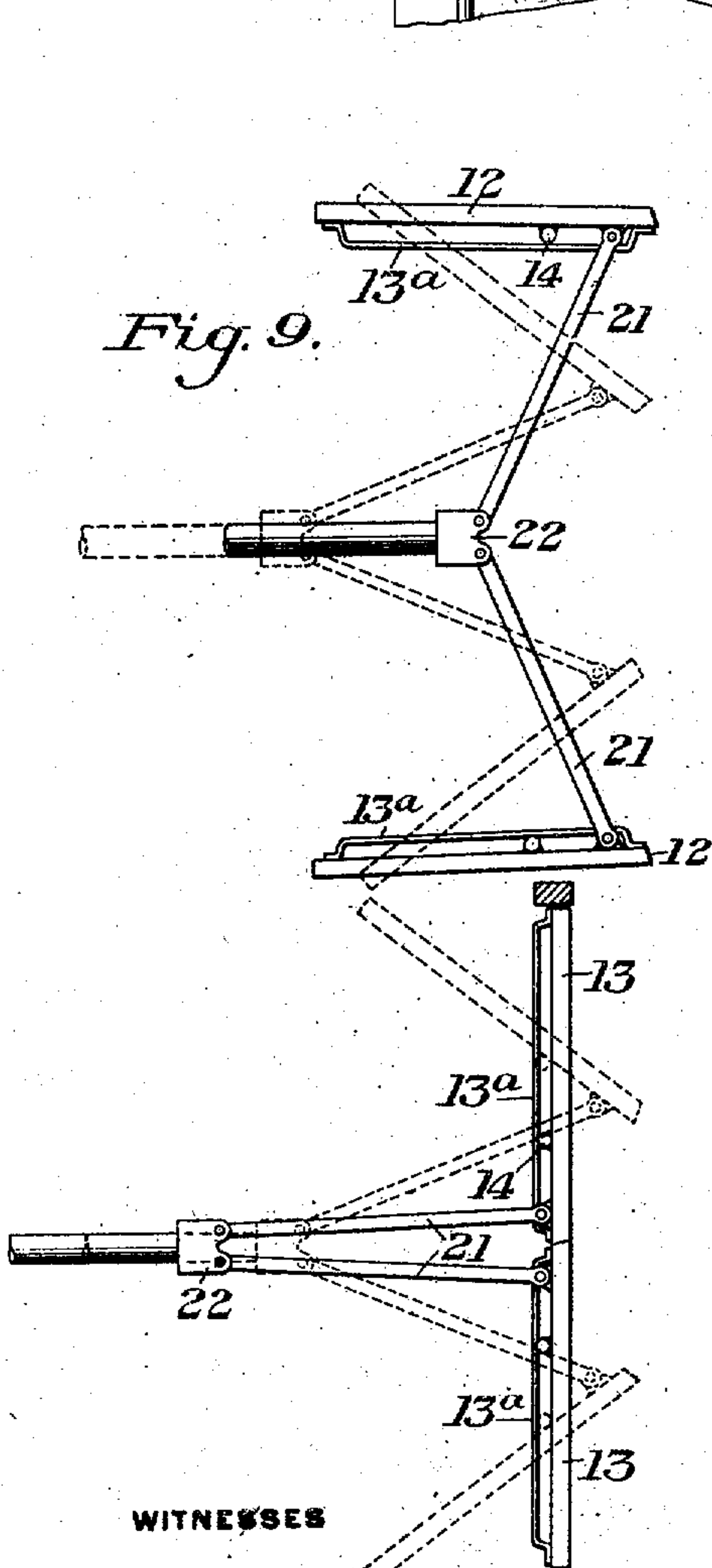
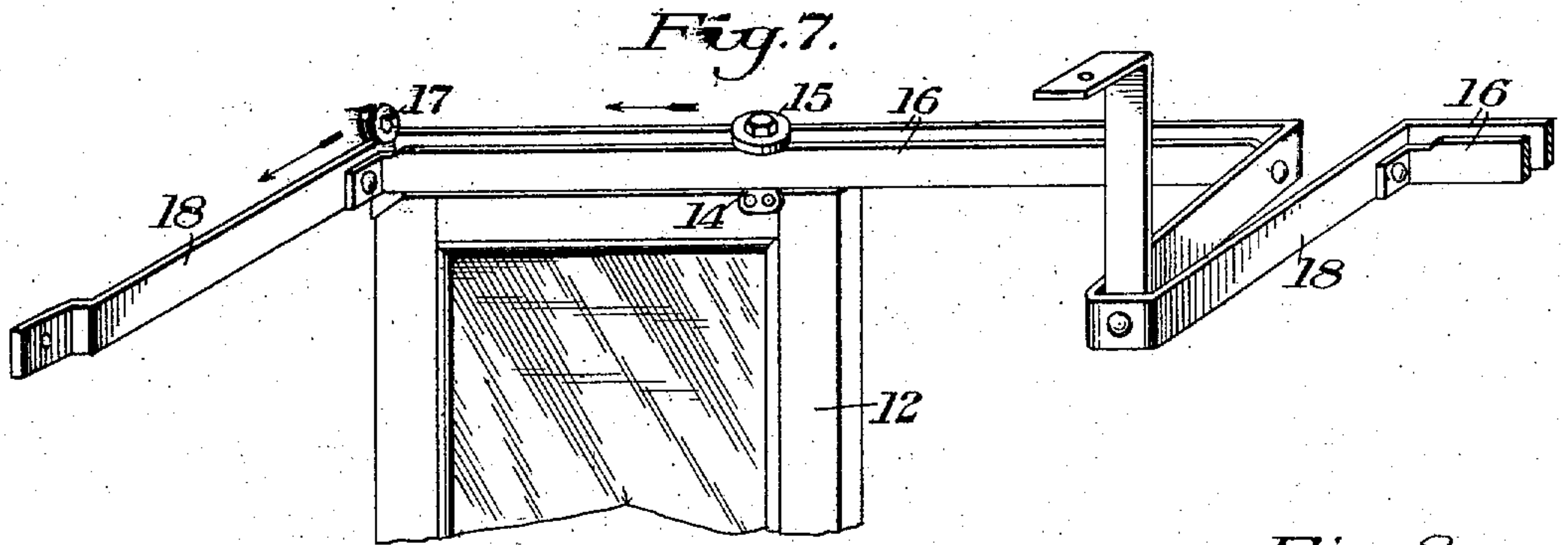
by Bakewell, Byrnes & Carmichael.
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P. N. JONES.
DOOR OPERATING MECHANISM FOR PASSENGER CARS.
APPLICATION FILED APR. 6, 1910.

966,335.

Patented Aug. 2, 1910.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

PEARL N. JONES, OF PITTSBURG, PENNSYLVANIA.

DOOR-OPERATING MECHANISM FOR PASSENGER-CARS.

966,335.

Specification of Letters Patent.

Patented Aug. 2, 1910.

Original application filed December 16, 1909, Serial No. 533,357. Divided and this application filed April 6, 1910. Serial No. 553,854.

To all whom it may concern:

Be it known that I, PEARL N. JONES, of Pittsburgh, Allegheny county, Pennsylvania, have invented a new and useful Improvement in Door-Operating Mechanism for Passenger-Cars, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

10 Figure 1 is a sectional plan view of the rear platform of a passenger car, the section being taken on the line I—I of Fig. 2. In this figure, the entrance doors are shown closed, while the exit doors are in their open positions; Fig. 2 is a vertical section on the line II—II of Fig. 1; Fig. 3 is a detail view of a portion of the door-operating mechanism; Fig. 4 is a detail view showing the pivot roller for one of the doors; Fig. 5 is a plan view of the car step; Fig. 6 is an elevation of a portion of one of the doors; Fig. 7 is a perspective view showing a portion of one of the doors and a portion of the upper track for the doors; Fig. 8 is a detail sectional view showing part of the door-operating mechanism; Fig. 9 is a diagram illustrating the door movements; and Fig. 10 is a diagram showing a modification.

This application is a division of my pending application Serial No. 533,357, filed December 16, 1909.

The present invention has more particular relation to the means for operating the entrance and exit doors of the car, the doors being so arranged and operated that in both their open and closed positions, they are substantially without projection beyond the side lines of the car, and the opening and closing movements being effected in such a way as to encroach but little upon the space of the car platform or vestibule.

A further object of my invention is to provide a door-operating mechanism which can be readily controlled by the operator of the car and which is simple and effective in its operation.

The precise nature of my invention will be best understood by reference to the accompanying drawings, in which I have illustrated the preferred embodiment thereof and which will now be described, it being premised, however, that various changes may be made in the details of construction and arrangement of the various parts, with-

out departing from the spirit and scope of my invention as defined in the appended claims.

In these drawings, the numeral 2 designates the platform of a car structure which is inclosed or vestibuled at one side and at the rear, as shown at 3.

4 is an opening communicating with the interior of the car and which is preferably without doors.

5 designates the car step arranged at one side of the platform or vestibule.

6 designates a bent rail or guard supported by the vertical posts 7, 8 and 9, and which separates the entrance space or passage from the exit space or passage 11.

12 designates two doors which control the exit, and 13 two other doors which control the entrance. These doors extend from a point near the car roof downwardly to the floor of the car step 5. In order to give clearance in turning corners and to bring these doors well within the side lines of the car, the vestibule and platform are of gradually decreasing width toward the rear end and the doors, together with the step, are set in the inclined plane of the side lines of the vestibule. Each door is provided at its upper end with a bracket 14, secured thereto and carrying a flanged roller 15, which is mounted to travel between and upon parallel track bars 16, as best shown in Fig. 7. The top of each door is also provided with a roller 17, which is adapted to travel on a portion 18 of the track, which extends inwardly at an obtuse angle to the track rail 16. The lower edge portion of each door is also provided with the two antifriction guide rollers 19, which are arranged to travel in ways or grooves in the floor of the car step 5, each of these ways or grooves having a longitudinal portion 20, and another portion 20^a, extending inwardly at an oblique angle to the portion 20, and corresponding to the portions 18 of the upper tracks. Connected to the outer or closing edge of each door is a link 21, the two links from each pair of doors being connected at their inner ends to a head 22, which is, in turn, connected to a slide 23, mounted on the parallel slide rods 24. It will be understood from Fig. 1, that one pair of the slide rods 24 is provided for the exit doors and a similar pair for the entrance doors.

The slide 23, which is connected to the exit doors, is connected by a link 25 with a crank arm 26, on a sprocket wheel 27, which is loosely mounted on the vertical post 9. This sprocket wheel is connected by a chain 28 with another sprocket wheel 29, which is rigidly secured to the vertical rod or post 8. This rod or post is journaled at its upper and lower ends to act as a shaft and is provided with an operating handle 30, within convenient reach of the conductor who stands adjacent to the railing 6. The slide 23 which controls the entrance doors is connected by a link 31 with a crank arm 32, which is rigidly secured to a sleeve 33, loosely mounted on the rod or post 8, and which is provided with an operating handle 34, adjacent to the handle 30, and also within convenient reach of the conductor.

The operation of the doors will be readily understood by reference to the diagram shown in Fig. 9. In this figure, the exit doors are shown as open in full lines, while the entrance doors are shown in their closed positions, the actuating connections for the respective doors being also partially shown in their proper position. Assuming the entrance doors to be closed and that it is desired to open them, the conductor grasps the handle 34, thereby rotating the sleeve 33 on the rod or post 8. This causes the crank arm 32 to actuate the links 31, and thereby the corresponding slide 23. This moves the slide 23 outwardly on the guide rods 24, and through the links 21 causes the doors to turn on the pivots formed by the rollers 15 and the corresponding bottom rollers 19. At the same time the doors turn on these pivots, they slide backwardly and inwardly on the rollers 17 and corresponding bottom rollers 19, on the angular portions 18 and 20^a of the tracks or ways, and until they assume the full open position. This full open position corresponds to the open position shown for the exit doors in Fig. 1. In closing the doors, the operation is the reverse, the slide 23 being moved back into the position shown in Fig. 1. The exit doors are operated in the same manner by means of the handle 30. This movement of the doors causes the grab handles 13^a to be on the inside of the doors when closed, so that they can not be grasped from the outside.

It will be observed that at no time during the opening and closing movement of the doors do their outer edges project beyond the side lines of the car; also that their movement is such in opening and closing as to encroach but little upon the entrance and exit spaces or passages. Each pair of doors is under the separate and complete control of the conductor, who usually stands within the bent portion 6^a of the railing or guard 6, for the purpose of collecting fares.

The connecting link 25 is provided with

a bend or offset 35, and the link 31 has a similar bend or offset 36. The bend or offset 35 is arranged to fit around the post or rod 9, when the exit doors are closed, in such a manner as to bring the centers of the connections between the wheel 27 and the slide 23 into such relation as to secure the doors in their closed positions. These centers, which are designated *a*, *b* and *c*, in Fig. 1, are also brought into such relation when the doors are in their open position, as to resist any tendency for them to accidentally move toward their closed positions. The links 21 may also be arranged, as shown in Fig. 10, so as to assume the locking position for the doors when opened. The bend or offset 26 in the link 31 acts in a similar manner with respect to the rod or post 8, as will be seen in Fig. 1.

By the described arrangement of the doors, in which they are made to extend downwardly when in their closed positions to a point adjacent to the outer edge of the step, they effectively prevent access to the step and thus prevent accidents due to persons jumping upon the step when the car is still in motion and before the doors have been opened.

The door-actuating mechanism is simple and positive in its character and enables the conductor to readily control the entrance and exit of the passengers. A similar arrangement of doors may be provided at each end of the car.

It will be obvious that many changes may be made in the details of construction and arrangement of the parts, without departing from the spirit and scope of my invention.

I claim:

1. In a passenger car, a pair of doors mounted to have a combined swinging and sliding movement, links connected to the doors, a slide to which the links are also connected, and actuating means for the slide, together with parallel guides for said slide, said guides projecting inwardly above the doors, substantially as described.

2. In a passenger car, a pair of doors mounted to have a combined swinging and sliding movement, links connected to the doors, a slide to which the links are also connected, and actuating connections for said slide, said connections being arranged to hold the doors in their open and closed positions, together with parallel guides for said slide, said guides projecting inwardly above the doors, substantially as described.

3. A passenger car having exit and entrance openings arranged side by side, a pair of doors for controlling each of said openings, said doors being mounted to have a combined swinging and sliding movement, an actuating slide connected to each pair of doors, and actuating connections for said slide, and a pair of rods projecting inwardly

above each pair of doors and forming guides for the said doors, substantially as described.

4. In a passenger car, a door mounted for combined swinging and sliding movement, guides on which the door moves from its closed position to a position substantially at right angles thereto when opened, an actuating slide mounted on guides inside of the doors and above their upper edges, actuating connections between the door and the slide, and means for reciprocating said slide, substantially as described.

5. In a passenger car, a door mounted for combined swinging and sliding movement, supports on which the door moves from its closed position to a position substantially at right angles thereto when opened, an actuating slide mounted on guides inside of the doors and above their upper edges, actuating connections between the door and the slide, an operating crank, and a link connecting said crank with the slide, substantially as described.

6. In a passenger car, two pairs of doors arranged side by side, two actuating slides mounted on guides projecting inwardly above the doors, actuating connections between each of said slides and one pair of the doors, and separate actuating means for each of said slides, and having members adapted to be grasped by the hand and arranged adjacent to each other; substantially as described.

7. In a passenger car, two pairs of doors arranged side by side, two actuating slides mounted on guides projecting inwardly above the doors, actuating connections between each of said slides and one pair of the doors, two crank members, each of which is connected to one of said slides, and separate actuating means for the two crank members; substantially as described.

8. In a passenger car, two pairs of doors arranged side by side, two actuating slides mounted on guides projecting inwardly above the doors, actuating connections between each of said slides and one pair of the

doors, two crank members each of which is connected to one of said slides, a vertical shaft carrying one of said crank members, and a second and concentric shaft geared to the other crank member; substantially as described.

9. A passenger car having an entrance and an exit opening arranged side by side, a pair of doors for controlling each of said openings, guides projecting inwardly over the car platform above the said doors, two slides mounted on said guides, operating connections between each slide and one pair of the doors, two vertical actuating shafts mounted on the car platform and having adjacent actuating means, and a separate actuating connection between each shaft and one of said slides; substantially as described.

10. A passenger car having an entrance and an exit opening arranged side by side, a pair of doors for controlling each of said openings, guides projecting inwardly over the car platform above the said doors, two slides mounted on said guides, operating connections between each slide and one pair of the doors, two vertical actuating shafts mounted on the car platform and having adjacent actuating means, said shafts being arranged one within the other, and a separate actuating connection between each shaft and one of said slides; substantially as described.

11. A passenger car having an entrance and an exit opening arranged side by side, a pair of doors controlling each of said openings, a vertical shaft on the car platform, actuating connections between said shaft and one pair of the doors, and a member mounted on said shaft and having an actuating connection with the other pair of doors; substantially as described.

In testimony whereof, I have hereunto set my hand.

P. N. JONES.

Witnesses:

GEO. H. PARMELEE,
H. M. CORWIN.