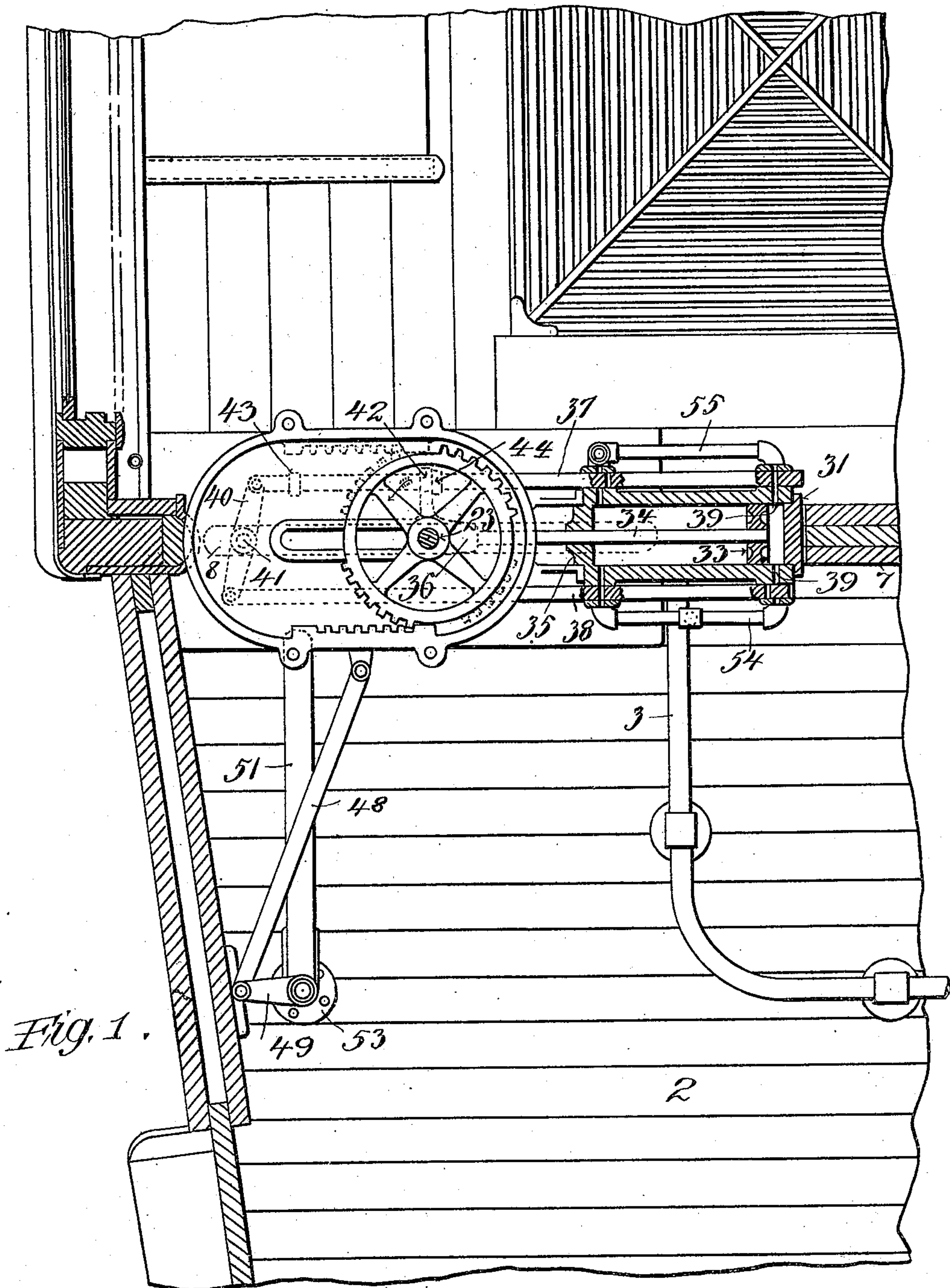


W. M. SMITH.
CAR DOOR AND MEANS FOR OPERATING IT.
APPLICATION FILED DEC. 9, 1908.

938,719.

Patented Nov. 2, 1909.
3 SHEETS—SHEET 1.



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By his Attorney
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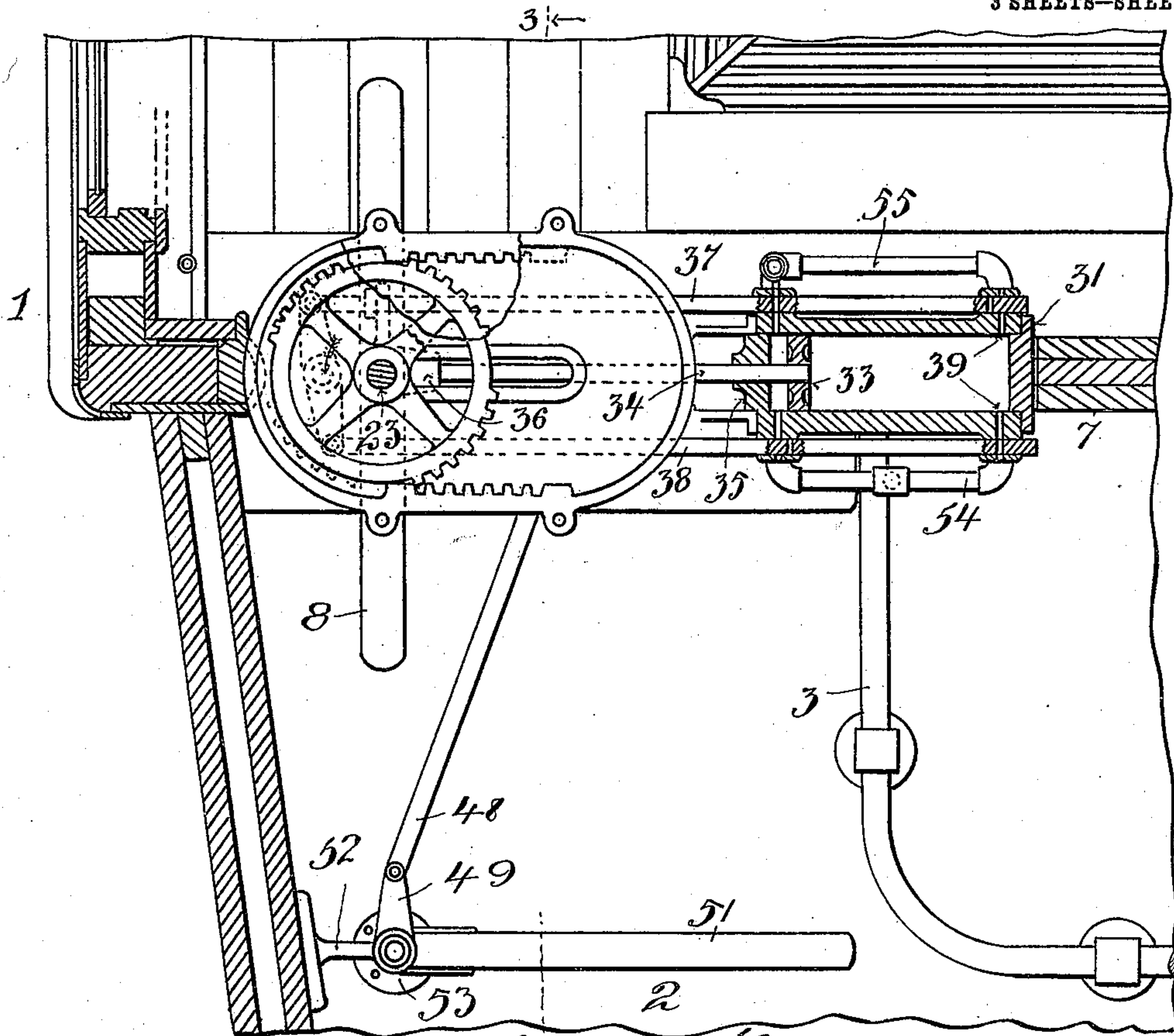


Fig. 2

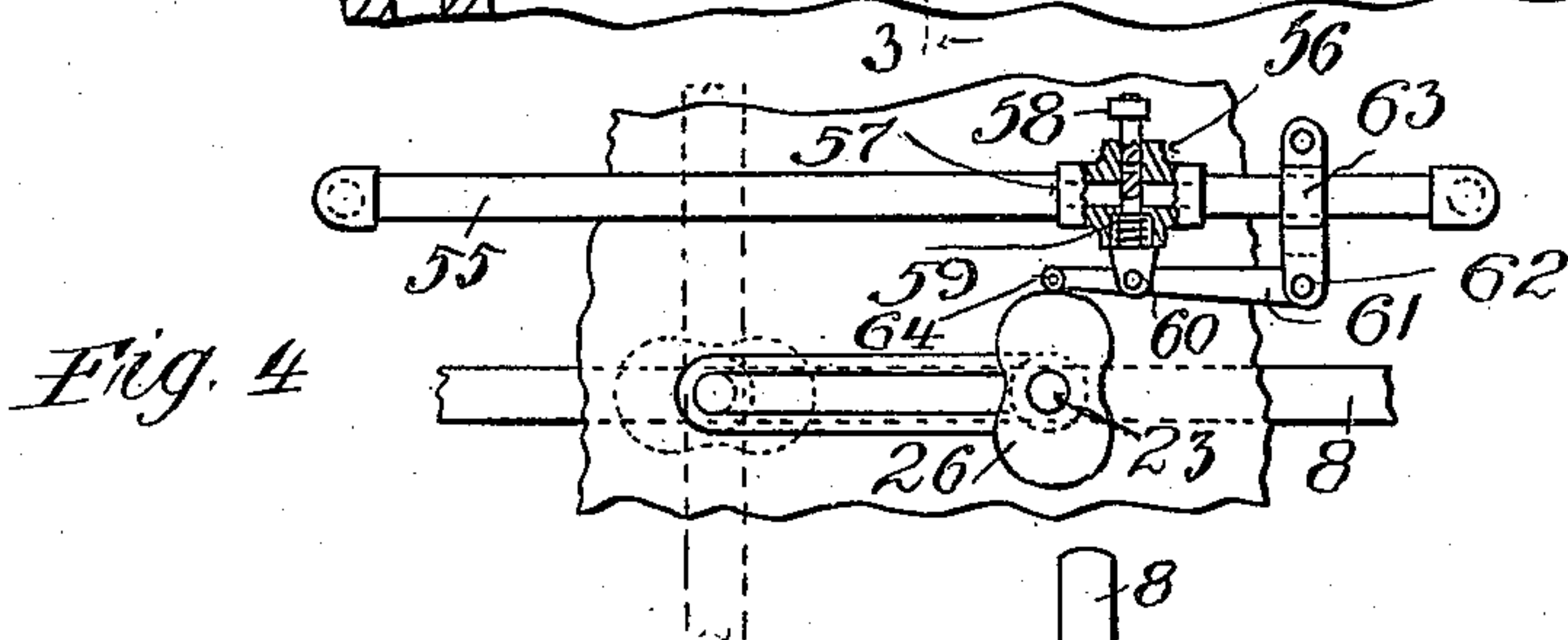


Fig. 4

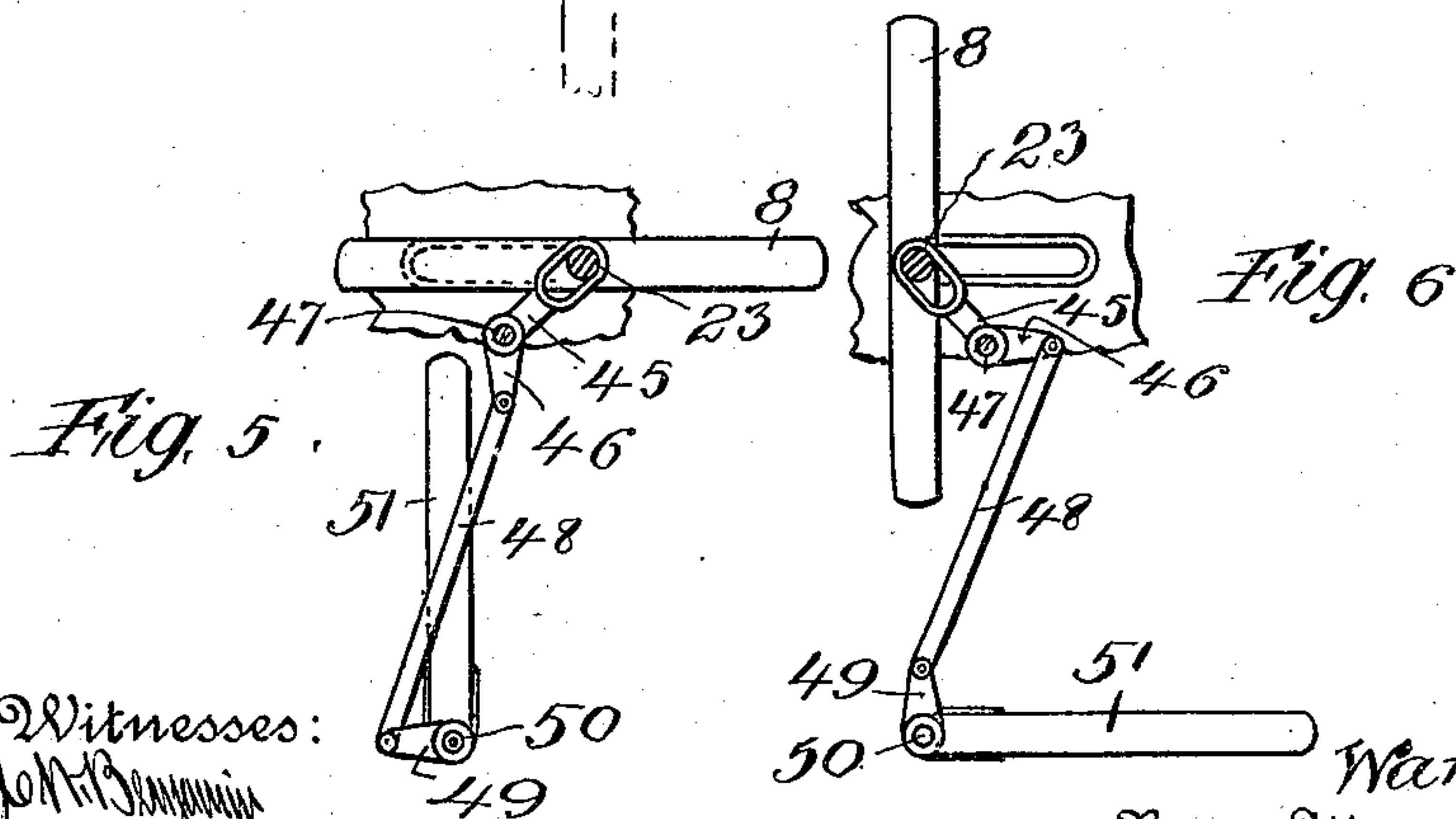


Fig. 5

Fig. 6

Witnesses:
J. H. Thompson
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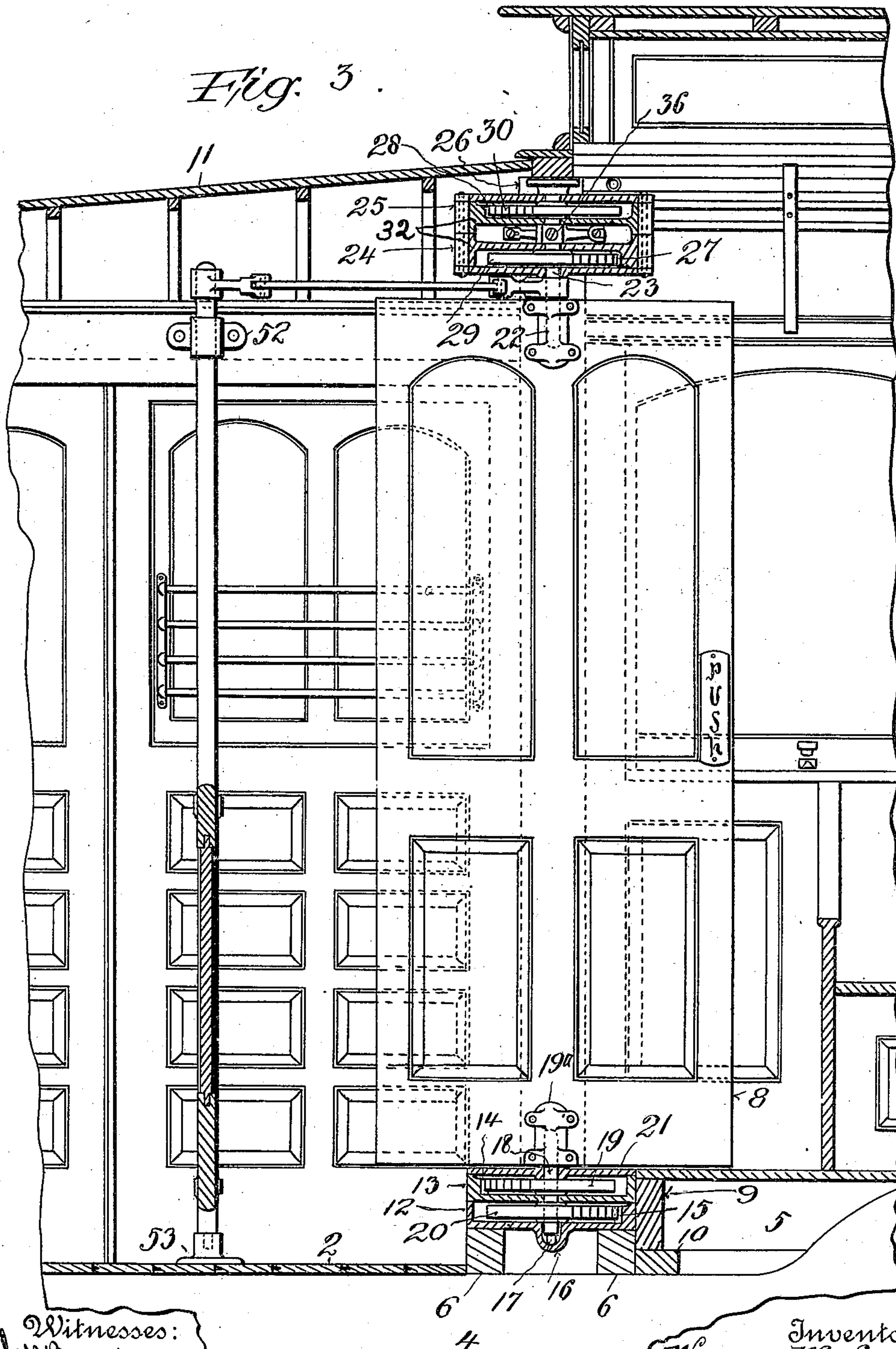
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3 SHEETS—SHEET 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

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CAR-DOOR AND MEANS FOR OPERATING IT.

938,719.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed December 9, 1908. Serial No. 466,628.

To all whom it may concern:

Be it known that I, WARREN M. SMITH, a citizen of the United States, and a resident of the borough of Prospect Park and county of Delaware, State of Pennsylvania, have invented a new and useful Improvement in Car-Doors and Means for Operating Them, of which the following is a specification.

The object of my invention is to provide a car of this class in which the door is swung in a peculiar manner and has devices co-operating therewith so that one passenger and one only is permitted to pass by said door at each opening thereof.

This object is accomplished by my invention, one embodiment of which is described below.

For a more particular description of my invention, reference is to be had to the accompanying drawings forming a part hereof, in which:

Figure 1 is a plan and sectional view of a car provided with my improvement, only the parts of the car adjacent to my improvement being shown and the door being in its closed position. Fig. 2 is a similar view to Fig. 1 except that the door is shown in its open position and the mechanism is shown correspondingly shifted. Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2, looking in the direction of the arrows. Fig. 4 is an enlarged view of the valve controlling mechanism. Figs. 5 and 6 are detailed plan views showing the relative positions of the gate and door when the door is both opened and closed.

Throughout the various views of the drawings, similar reference characters designate similar parts.

A "pay-as-you-enter" car 1 is provided with the usual large platforms 2 on which are mounted the conventional rails 3 which separate the conductor from the ingoing passengers. This car 1 is also provided with the usual platform knees 4 which extend from the longitudinal sills 5 to the other extremity of the platform and beyond to the bumper.

The platform knees 4 are fixed to and support car crossings 6 on which the end wall 7 of the car is carried as well as the door 8, as will more particularly appear below. The crossings 6 are parallel with the end adjacent to the crossing 9 at the ends of the sills 5 and a horizontally disposed crossing 10 is

placed on the platform knees 4 and immediately below the ends of the sills 5. A suitable hood 11 is supported in the usual manner and the car body is also of the conventional type and may be provided with either transverse or longitudinal seats.

The essence of my invention resides in the mounting of the door 8 and the parts operating therewith.

The transverse sills 6 carry casings 12 and 13 each of which is provided with a rack on opposite sides, the casing 12 carrying a rack 15 on the side next the interior of the car. The casing 12 is provided with a central depression 16 along its medial line which forms a runway for a ball or other bearing 17 set in a pin 18 which is mounted in a socket 19^a. Interrupted gears 19 and 20 respectively have teeth in different quadrants which teeth are so arranged and disposed that they will mesh with the racks 14 and 15 respectively at successive periods and not simultaneously. The lower wall, or bottom of the casing 13 is provided with a longitudinal slot to permit the pin 18 to move freely therein. The casing 13 is surmounted by a door sill 21 which also is provided with a longitudinal slot in which the pin 18 moves as the door operates.

The upper edge of the door 8 is provided with a socket 22 in all respects similar to the socket 19^a in which is mounted a vertically disposed pin 23 with the same axis as the pin 18 and extending upwardly above the door and passing through the parallel casings 24 and 25, each of which is provided with a top and bottom, suitably slotted to permit the pin 23 to pass therethrough. The extreme upper end of the pin 23 is provided with a double acting cam 26 the function of which will appear below. The casing 24 is provided with a rack-bar 27 in all respects identical with the rack-bar 15 and the casing 25 is provided with a rack-bar 28 in all respects identical with the rack-bar 14 and the pin 23 is provided with interrupted gears 29 and 30 respectively, which mesh with racks 27 and 28, as shown in Fig. 3.

An air cylinder 31 is fixed in the end wall 7 and is attached to the casings 24 and 25 by suitable webs 32 so that the cylinder 31 is always held in alinement and in fixed relation to the casings 24 and 25. The cylinder 31 is provided with the usual piston 33

from which extends the piston rod 34 in the conventional manner through the front cylinder head 35 and has its free end forming a bearing 36 in which the upright pin 23
 5 revolves as it moves in the slots in the casings 24 and 25. Parallel to the piston 34 are the valve rods 37 and 38 which control the slide valves 39 by means of the rods 37 and 38. These rods are connected at their
 10 outer ends by a lever 40 pivoted at 41 so that they will move in opposite directions whenever actuated. The bearing 36 also has a forked projection 42 which straddles the rod 37 which is provided with suitable
 15 stops 43 and 44 so that when the door reaches the limit of its movement the air pressure in the cylinder is reversed and the door is drawn back, as will more fully and at length appear below.

20 The pin 23 passes through the slotted arm 45 of a bell crank lever 46 pivoted at 47 and the other arm is pivotally connected by a link 48 with a second arm 49 extending from an upright 50 to which a gate 51 is attached,
 25 the arm 49 being attached to a vertical upright which constitutes a pivot for the gate 51. The pivot 47 is vertically mounted and downwardly disposed in the bottom of the casing 24. The pivot 50 of the gate 51 has
 30 its upper end journaled in a suitable bearing 52 and its lower end in a suitable socket 53 on the floor 2.

The ports 39 are connected with the exhaust 54 and with the air supply pipes 55.
 35 The air is governed in the supply pipes 55 by means of a slide valve 56 mounted therein as follows: This valve 56 has a transversely disposed passage in its casing 57 in which is a stem 58 with a suitable perfora-
 40 tion so that it can be either opened or closed by moving in the direction of its length. The casing 57 has an enlarged opening concentric with the opening in which the stem 58 is placed and in this opening is a coil
 45 spring 59 which bears against the casing 57 at its upper end and at its lower against a bracket 60 connected with a lever 61, fulcrumed at 62 through a clamp 63 secured to said pipe 55. The lever 61 at its free end
 50 is preferably provided with a roller 64 which presses against the outer periphery of the cam 26.

The operation of my improved mechanism is as follows: Assuming the parts to be
 55 as shown in Figs. 1, 4 and 5, the gate 51 is open and a passenger, after paying his fare to the conductor, presses against the side of the door at his right and thereby revolves the same on its vertical axis. This revolving
 60 of the door on its vertical axis opens the valve 56 and permits a small amount of air to get in the rear of the piston 33 whereby air pressure is applied and the interrupted gears 19 and 30 mesh with their respective
 65 racks 14 and 28 whereby the door is shifted

laterally to the left of the person entering the car. The air pressure is carefully throttled so as not to be too great so that the door will not operate too rapidly and the valve 56 is made and regulated accordingly. 70
 When the door 8 reaches its extreme movement the arm 42 presses against the stop 43 and shifts the valve so that air is exhausted in the rear of the piston 33 and admitted in front of the same thereby causing the
 75 door to move from left to right and at the same time the lower interrupted gears 29 and 30 become operative and they mesh with their respective racks 27 and 15 so that the door is still revolved in the same direc- 80
 tion as before and closes behind the person entering the car. A second person is prevented from following the first by the door 8 by means of the gate 51 which is connect- 85
 ed by the levers and links above described with the pin 23 so that the moving of this pin from left to right and right to left closes and opens the gate 51, as is obvious.

While I have shown and described one embodiment of my invention, it is obvious 90
 that it is not restricted thereto, but is broad enough to cover all structures that come within the scope of the annexed claims.

What I claim is:

1. In a car of the class described, a door 95
 and means for mounting the same so that when the door is opened it revolves about a central axis and automatically shifts toward one side and when closed it revolves in the same direction and its axis shifts in the op- 100
 posite direction.

2. In a device of the class described, a door and means for mounting the same so that when said door is opened it revolves on its axis and shifts to one side and when 105
 closed it continues revolving in the same direction and shifts toward the other side, a gate and means for causing this gate to move in unison with said door so that the gate will be open when the door is closed 110
 and the door will be closed when the gate is open.

3. In a device of the class described, a door having upwardly and downwardly extending pins, interrupted gears mounted on 115
 said pins, racks and means for supporting the same adjacent to said gears so that when said door is used it is rotated in one direction only, and means for giving said door a positive movement transversely of its axis 120
 and while it is rotating.

4. In a car of the class described, a door and pins extending therefrom, interrupted gears mounted on said pins, racks adjacent to said gears and adapted to mesh there- 125
 with, and means for positively moving said door laterally of its axis while it is being opened and closed.

5. In a car of the class described, a door, pins extending upwardly and downwardly 130

from the upper and lower edges of said door, a slideway and bearing for the lower end of one of the said pins, interrupted gears on said pins, a rack, an air cylinder
5 and means for supplying air to said cylinder under pressure, a piston in said cylinder and a rod extending therefrom and connected with one of said pins, valves connected with said cylinder, rods extending
10 from said valves and means on said rods connecting therewith and coöperating with said piston rod for controlling the air pres-

sure and exhaust and a second valve mechanism connected with one of said pins for admitting and shutting off the supply of
15 air to said cylinder.

Signed at the city and county of Philadelphia, State of Pennsylvania, this 7th day of December, 1908.

WARREN M. SMITH.

Witnesses:

FORREST A. SMITH,
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