

P. N. JONES.
DOOR OPERATING MECHANISM.
APPLICATION FILED SEPT. 20, 1911.

1,061,298.

Patented May 13, 1913.

3 SHEETS-SHEET 1.

Fig. 1.

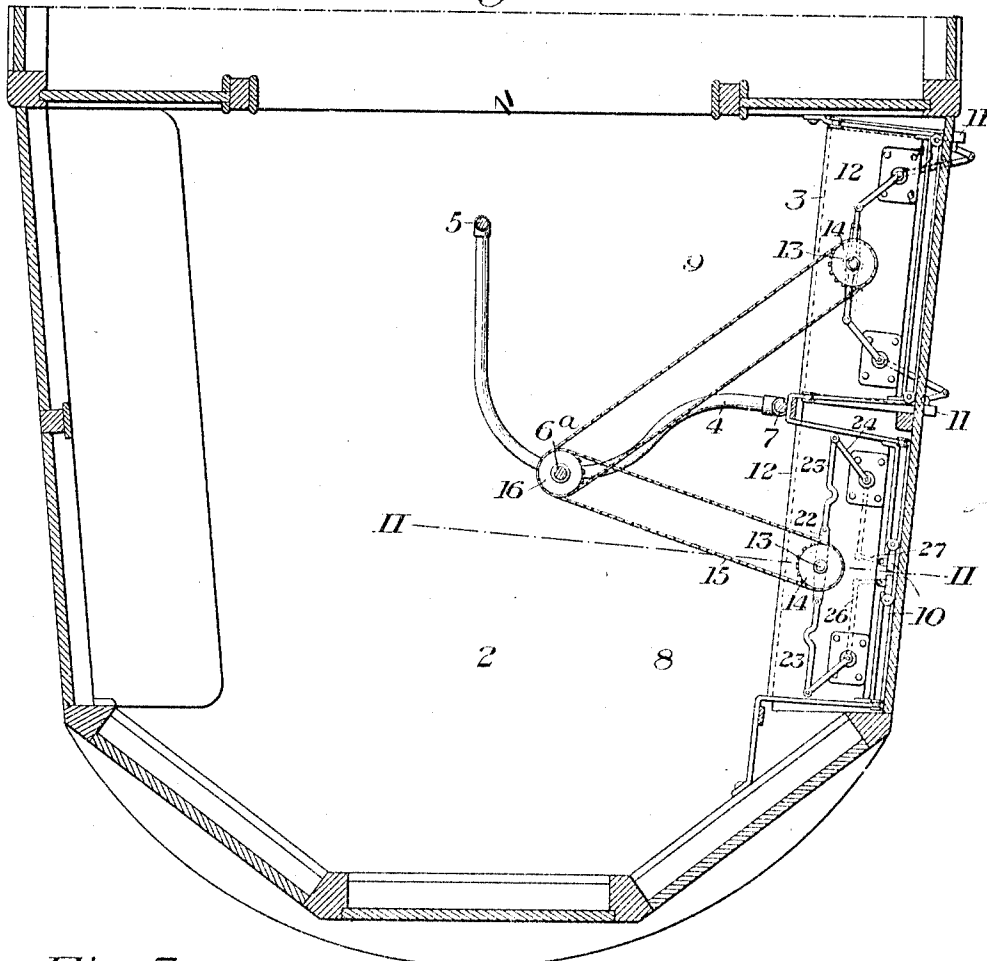
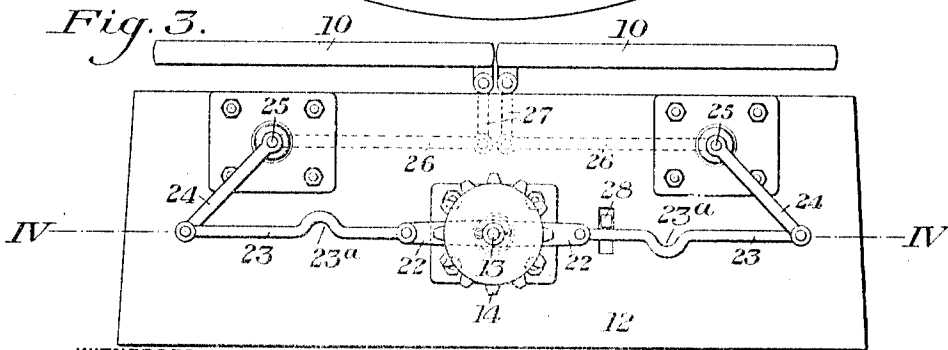


Fig. 3.



WITNESSES
R. A. Balderson
W. F. Lammie

INVENTOR
P. N. Jones,
by R. A. Balderson, R. F. Lammie,
Attys

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3 SHEETS—SHEET 2.

Fig. 2.

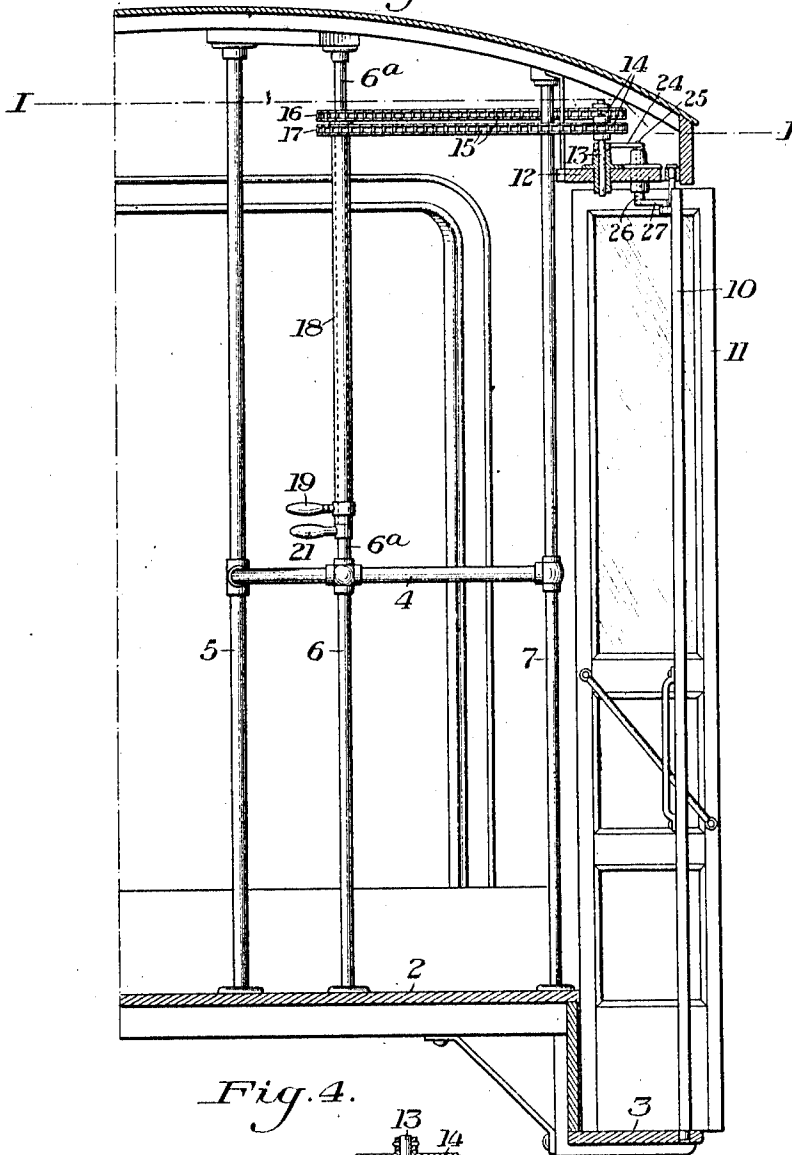
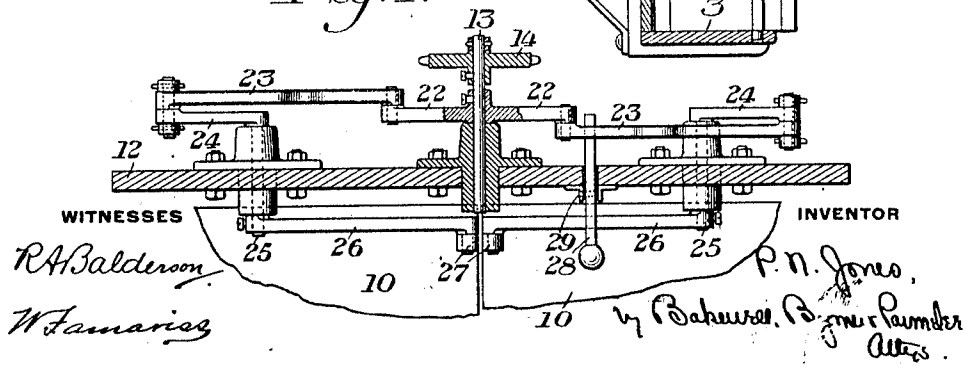


Fig. 4.



WITNESSES

R. A. Balderson

W. H. Amari

INVENTOR

P. N. Jones

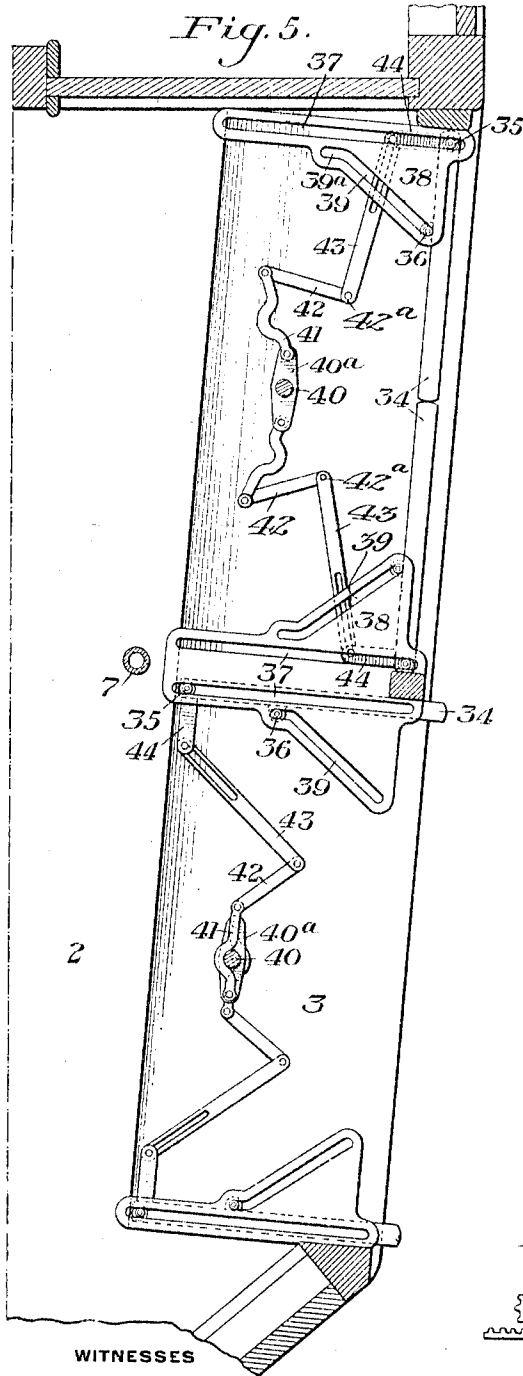
by B. H. Jones, Attorney

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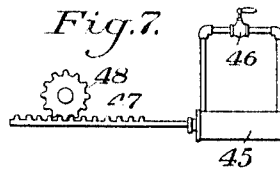
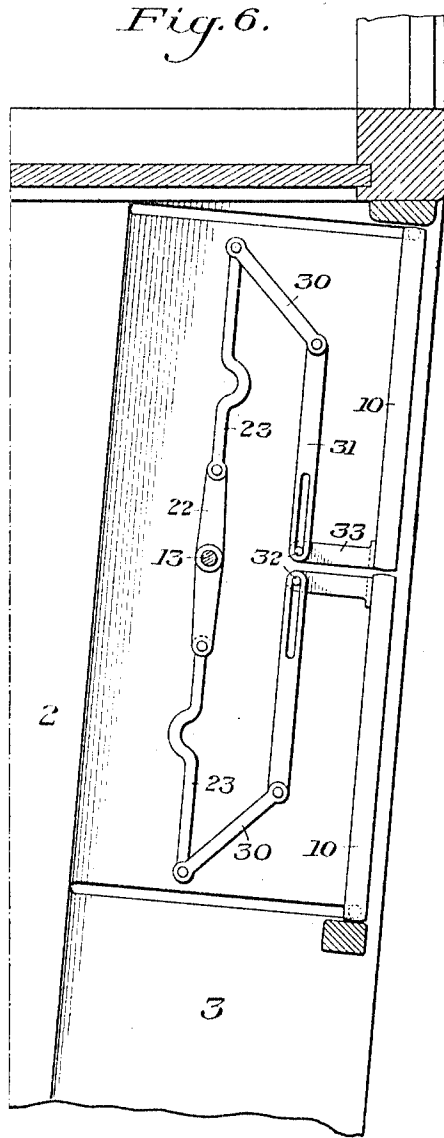
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3 SHEETS-SHEET 3.



R. A. Balderson
W. F. Mariss



INVENTOR
P. N. Jones,
by B. A. Jones, B. J. Jones, B. J. Jones
Attys.

UNITED STATES PATENT OFFICE.

PEARL N. JONES, OF PITTSBURGH, PENNSYLVANIA.

DOOR-OPERATING MECHANISM.

1,061,298.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed September 20, 1911. Serial No. 650,405.

To all whom it may concern:

Be it known that I, PEARL N. JONES, a resident of Pittsburgh, Allegheny county, Pennsylvania, have invented a new and useful Improvement in Door-Operating Mechanism, 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 horizontal sectional view illustrating one embodiment of my invention and applied to car doors, the plane of section being taken on the line I—I of Fig. 2; Fig. 2 is a section on the line II—II of Fig. 1; Fig. 3 is a plan view showing the operating connections for one pair of doors and its connections thereto; Fig. 4 is a section on the line IV—IV of Fig. 3; Fig. 5 is a plan view, partly in section, and partly diagrammatic, illustrating a modification of the invention; Fig. 6 is a sectional plan view showing another modification; and Fig. 7 is a detail view showing still another modification of a portion of the mechanism.

25 My invention has relation to door-operating mechanism, and has been more particularly designed for use in connection with a swinging and sliding door arrangement such as described and claimed in my Patent No. 964,269 of July 12th, 1910. While I have shown the invention as applied to the door arrangement of the said patent, it is not, however, limited thereto, but may be used with other arrangements of doors, either swinging or sliding.

35 The object of my invention is to provide an operating mechanism which is simple and positive in its operation, which is not likely to get out of order, which can be arranged to lock the doors in either their open or closed positions, or both, and which will meet the requirements of a device of this character, as will hereinafter more fully appear.

45 Referring first to that form of my invention shown in Figs. 1 to 4, inclusive, the numeral 2 designates the platform of a car structure, which is shown as inclosed or vestibuled at one side and at the rear. 3 designates a step arranged at one side of the platform or vestibule, and 4 is a bent rail or guard which is shown as supported by the vertical posts 5, 6 and 7, and which separates the entrance space or passage 8 from the exit space or passage 9. 10 designates a pair

of doors, which control the entrance, and 11 designates a similar pair of doors controlling the exit. These doors extend from a point near the car roof downwardly to the floor of the step 3. The doors 10 and 11 are mounted in the manner described in my said Patent 964,269, so as to have a combined swinging and sliding movement, assuming edgewise positions when open substantially perpendicular to their closed positions, and being substantially within the side lines of the car in both open and closed positions. In Figs. 1 and 2 the doors 10 are shown closed, while the doors 11 are shown as opened. 12 designates a support, which is secured a short distance below the roof of the car directly over the step. Suitably journaled in this support are the two rotary shafts 13, one for each pair of doors. In these figures each shaft 13 is shown as having secured thereto a sprocket wheel 14 which is connected by a sprocket chain 15 to the respective sprocket wheels 16 and 17. The sprocket wheel 17 is secured to a sleeve 18 rotatably mounted on the post 6 and having an operating handle 19, while the sprocket wheel 16 is secured to the shaft portion 6^a of the post 6, and is provided with another operating handle 21. Secured to each shaft 13 are the oppositely extended arms 22, each of which is connected by link 23 with a crank arm 24, which is secured at its opposite end to a short shaft 25 mounted on the support 12. Each shaft 25 has another crank arm 26, which is connected by link 27 with one of the doors, the connections being best shown in Figs. 1 and 3. It is obvious that the support 6 may be omitted and the shaft 6^a may be supported from the roof portion of the car in any suitable manner. It will be readily seen that if the doors are closed, and either one of the handles 19 or 21 is actuated, the resulting rotation of the shaft 13 will actuate the connections 23, 24, 26 and 27, to cause the doors to move to the open positions shown. While the reverse movement of either of said handles will cause the corresponding pair of doors to be closed. It will be seen that when the doors are in their closed positions as shown in Fig. 3, they are held or locked in such positions by the relations of the centers of the arms 22 and links 23. For the purpose of also holding or locking the doors in their open positions, each link 23 is formed with a

bend or offset 23^a, which is arranged, when the doors are at their full open positions to engage the shaft 13 in the manner shown, to thereby act as a lock. In some cases it may be required to provide means whereby the exit doors can be readily opened by a passenger from the inside of the car independently of the actuating handle. For this purpose I may provide the pivoted lever 28 (see Figs. 3 and 4), depending through the support 12 and pivoted at 29. The upper end of this lever engages one of the links 23. If the lower end of the lever is pushed outwardly, it will engage the link 23, and move it to effect the opening of the exit doors.

In the modification shown in Fig. 6, the actuating connections between the links 23 and the doors are slightly changed, and consist of the links 30, which are connected at one end to the outer ends of the links 23 and at their other ends to the outer ends of links 31. The inner ends of each link 31 has a pin and slot connection 32 with an inwardly projecting arm 33 rigidly secured to one of the doors. The movement of the doors is the same as in the form first described, the pin and slot connection 32 preventing any binding of the parts and taking the place of the links 27.

Fig. 5 shows a modification in which the doors are mounted in the manner described in my said Patent No. 964,269, except that the angle formed by the paths of two points of support is more obtuse than in the drawings of the patent referred to. Each door member 34 is provided at its upper edge portion with two guiding elements or rollers 35 and 36, the roller 35 being arranged to move in the transverse slot 37 of a guide bracket 38; while the roller 36 is arranged to move in the oblique slot 39 of said bracket. The lower edge portion of each door is provided with similar guides (not shown). The actuating mechanism for the door may be substantially the same as that shown in Figs. 1 to 4, the shaft 40 corresponding to the shaft 13, the arms 40^a corresponding to the arms 22; and the links 41 corresponding to the links 23. Each link 41 is connected to one of the doors by the lever arms 42 and 43, the latter having a slotted connection with an inwardly projecting arm 44 rigidly secured to the door near its rear edge. The pivotal axes 42^a of the levers 42 and 43 are fixed. The movement of the doors in opening and closing will be readily seen by comparing the closed position of one pair of doors shown in Fig. 5 with the open position thereof shown in the other side of the same figure. It will be seen that the rollers 35 will move back in the slots 37 faster than the rollers 36 will move in the slots 39, and that the result will be to cause the door when open to assume the right-angled position shown. The inner ends of

the slots 39 are preferably formed with straight portions 39^a to assist in holding the doors in their open positions, being engaged by the rollers 36 at this time.

The advantages of my invention will be apparent. It provides a simple and easily actuated mechanism whereby either one or two pairs of doors may be controlled from a single point. When applied to a car door system such as that of my previous patent, it is very desirable since all the actuating mechanism is near the roof of the car entirely above the heads of passengers, and consists of but few parts which are of a character not likely to become deranged or out of order.

It will be obvious that various changes can be made in the details of construction and arrangement of the parts. Thus, the actuating shafts may be provided with any suitable arrangement of supports; the details of the actuating connections may be otherwise changed; other means may be employed in lieu of the sprocket chains shown, and instead of the mechanism being actuated manually it may be actuated in various other ways. Thus, in Fig. 7 I have indicated a mode of operation by the use of compressed air. In this figure 45 designates a double-acting cylinder having a control valve 46, and whose piston actuates a rack 47 engaging a gear wheel 48. This gear wheel may be connected to any one of the sprocket wheels shown in the other figures. It will, of course, be necessary to provide a separate actuating cylinder for each pair of doors, where two pairs of doors are employed.

What I claim is:—

1. The combination with a pair of doors, said doors being mounted to have a combined swinging and sliding movement, a pair of shafts mounted in stationary bearings and having connections arranged to simultaneously open and close the co-acting pair of doors, and connections for simultaneously turning said shafts; substantially as described.

2. The combination with a pair of doors, said doors being mounted to have a combined swinging and sliding movement, a pair of inter-connected rotary shafts mounted in stationary bearings and having connections arranged to simultaneously open and close the co-acting doors, and means for simultaneously turning said shafts; substantially as described.

3. The combination with a pair of doors mounted to have a combined swinging and sliding movement, a rotary shaft, actuating means connected to said shaft, oppositely extending arms rigidly secured to said shaft, a bent link connected to each of said arms, and link and lever connections between each of said links and one of the doors, the bends in the links being arranged

to have a locking engagement with the said shaft when the doors are opened; substantially as described.

4. In car door operating mechanism, the combination with a pair of doors mounted to have a combined swinging and sliding movement, of a support mounted above the upper edges of the doors, a shaft journaled in said support, actuating connections for said shaft, and link and lever connections extending from said shaft to each of the doors; substantially as described.

5. In car door operating mechanism, the combination with two pairs of doors arranged side by side, each door being mounted to have a combined swinging and sliding movement, of a rotary shaft supported above the upper ends of each of the pairs of doors, link and lever connections between each shaft and the doors of one pair of doors, and separate operating connections for the two shafts, said connections having concentrically arranged members provided with actuating means located adjacent to each other; substantially as described.

6. The combination of a pair of doors each of which is mounted to have a combined swinging and sliding movement to and from open and closed positions which

are at substantially right angles to each other, of a rotary shaft having oppositely extending arms rigidly connected thereto, a link and lever connection between one of said arms and one of the doors, and a similar connection between the other arm and the other door, the link and lever elements assuming locking positions in the open and closed positions of the doors; substantially as described.

7. The combination of a pair of doors each of which is mounted to have a combined swinging and sliding movement to and from open and closed positions which are at substantially right angles to each other, of a rotary shaft having oppositely extending arms rigidly connected thereto, a link and lever connection between one of said arms and one of the doors, and a similar connection between the other arm and the other door, said arms and link and lever connections being mounted above the doors; substantially as described.

In testimony whereof, I have hereunto set my hand.

PEARL N. JONES.

Witnesses:

GEO. B. BLEMING,
GEO. H. PARMELEE.