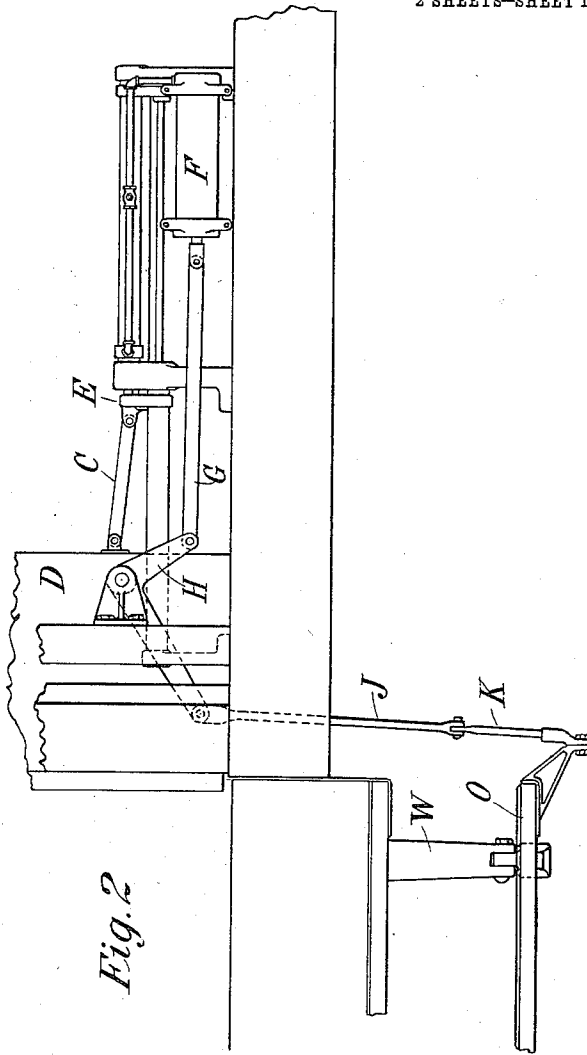
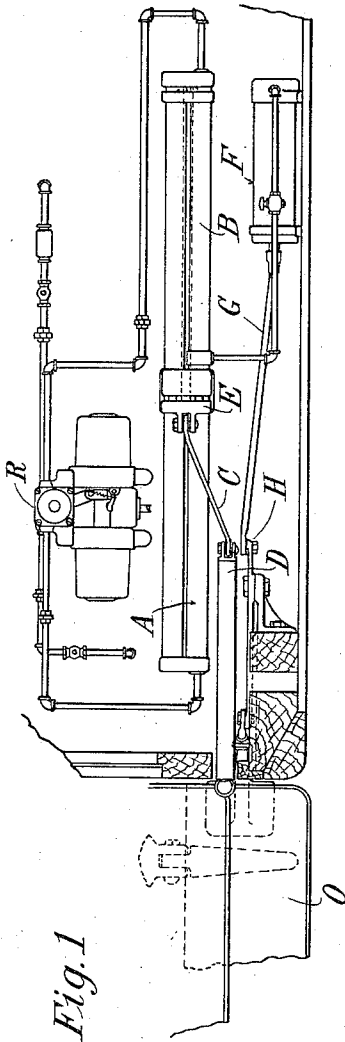


J. F. McELROY.
DOOR AND STEP MOTOR.
APPLICATION FILED FEB. 29, 1912.

1,063,370.

Patented June 3, 1913.

2 SHEETS—SHEET 1.



WITNESSES:
L. T. Shaw
W. C. Decker

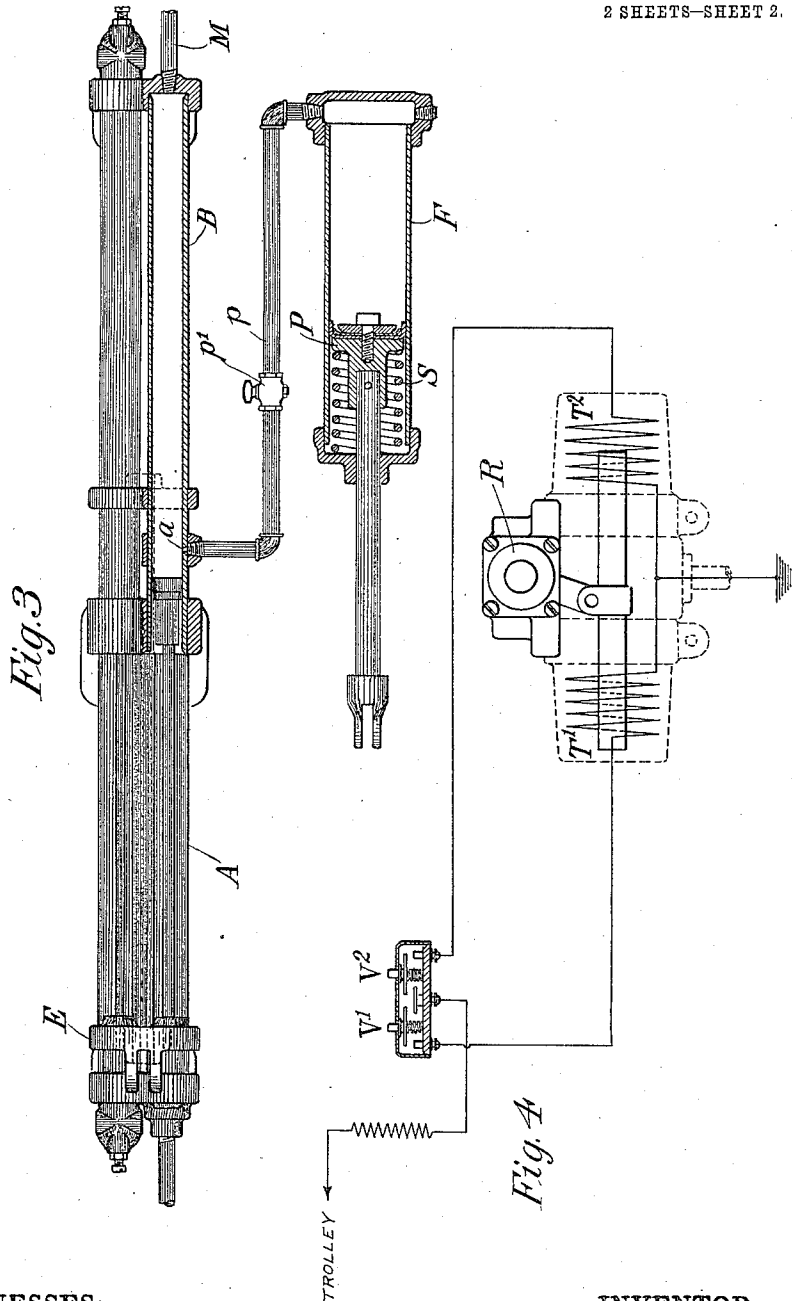
INVENTOR
James F. McElroy
BY *E. M. Bentley*
ATTY

J. F. McELROY.
DOOR AND STEP MOTOR.
APPLICATION FILED FEB. 29, 1912.

1,063,370.

Patented June 3, 1913.

2 SHEETS-SHEET 2.



WITNESSES:

L. I. Shaw
W. E. Decker.

INVENTOR

James F. McElroy

BY

E. W. Brantley

ATTY

UNITED STATES PATENT OFFICE.

JAMES F. McELROY, OF ALBANY, NEW YORK, ASSIGNOR TO CONSOLIDATED CAR-
HEATING COMPANY, A CORPORATION OF WEST VIRGINIA.

DOOR AND STEP MOTOR.

1,063,370.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed February 29, 1912. Serial No. 680,697.

To all whom it may concern:

Be it known that I, JAMES F. McELROY, a citizen of the United States, residing at Albany, county of Albany, State of New York, have invented certain new and useful Improvements in Door and Step Motors, the following being a full, clear, and exact disclosure of the one form of my invention which I at present deem preferable.

For a detailed description of the present form of my invention, reference may be had to the following specification and to the accompanying drawing, which illustrates my invention.

Figure 1 is a plan view of the motor; Fig. 2 is a side elevation thereof; Fig. 3 is a detailed view partly in section; Fig. 4 is a diagram of the electric circuits which control the motor.

My invention relates to a motor for operating both the door and the step of a railway car although other double operations of the same kind may be performed thereby.

Referring to the drawings, the car door D, which is of the sliding type, is connected by an operating push-link C to a crosshead E which is moved in a direction to open the door by a cylinder A and in a direction to close the door by a cylinder B. A cylinder F parallel to A and B operates the step O, hinged to post W, by means of a push-link G, angle-lever H and links J and K. The piston P in cylinder F is operated to raise the step from operative to inoperative positions by the air pressure admitted in its rear which also compresses a spring S that acts, when the air pressure is released, to start the step toward its dropped position, the remainder of its downward movement being preferably by gravity. Air is admitted to cylinder F by a port *a* in cylinder B through a pipe *p* containing an adjusting cock *p'*. Thus when air pressure is admitted to cylinder B to close the door D, the piston in that cylinder will, near the end of its travel, uncover port *a* to its compression side and admit air to cylinder F which will then lift step O and compress spring S. The pressure in cylinder F will remain so long as the pressure in cylinder B is maintained. When the door is opened by cylinder A, the piston of cylinder B is forced back beyond the port *a*, at a point near the beginning of its travel, leaving that port open to the atmosphere. Thereupon the

spring S forces the step out from its raised vertical position and allows it to drop by gravity. I control the motor by a valve R of any well known kind which will admit pressure to and exhaust it from cylinders A and B alternately. The valve R is operated by magnets T¹, T² which may be controlled by push-buttons V¹, V² respectively. The cock *p'* serves to determine the force of the step-raising cylinder.

What I claim as new and desire to secure by Letters Patent is:

1. The combination with a step-operating motor of a door operating motor including a door-closing cylinder having a port, a pneumatic connection between the port and the step operating motor, and a piston in said cylinder and coöperating with said port to control the step-operating motor.

2. The combination with a step-operating cylinder and a step-operating spring of a door-closing cylinder having a port controlled by its piston and controlling the said step-operating cylinder.

3. The combination with a step-operating cylinder and a step-operating spring, of a door-closing cylinder and a separate door-opening cylinder having its piston connected with the piston of the door-closing cylinder and serving to retract the same, the piston of the said door-closing cylinder serving to control a port which is alternately the admission and exhaust port of the step-operating cylinder.

4. The combination with a step-raising cylinder, of a step-starting spring compressed by the piston of said cylinder and a door-closing cylinder controlling a port which communicates with said step-raising cylinder and serves alternately as the admission and exhaust port therefor.

5. The combination with a step-raising cylinder and a step-starting spring acting in opposition to the pressure in said cylinder, of an inlet pipe communicating with the rear end of said cylinder, a controlling cock in said pipe, an open-ended door-closing cylinder communicating with said pipe and a piston therein acting to put the pipe in communication with the pressure side and the exhaust side thereof alternately.

6. The combination with parallel and single-ended door-closing and step-raising cylinders, of push-links connecting them with the door and step respectively, an inlet-

pipe connecting with the rear end of the step-raising cylinder and with the forward end of the door-closing cylinder and a piston in the last mentioned cylinder acting to
5 connect said pipe to the compression and exhaust sides of said piston alternately.

7. The combination with a door-closing and door-opening motor of a manually operated controller therefor, a step-operating
10 cylinder, a pneumatic connection between said cylinder and said motor and controlled

by the motor at the beginning of the door-opening stroke and the end of the door-closing stroke, and means for imparting an initial lowering movement to said step. 15

In witness whereof I have hereunto set my hand, before two subscribing witnesses, this 26th day of February, 1912.

JAMES F. McELROY.

Witnesses:

HERBERT A. CAULKINS,
CLARENCE PALMER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."