

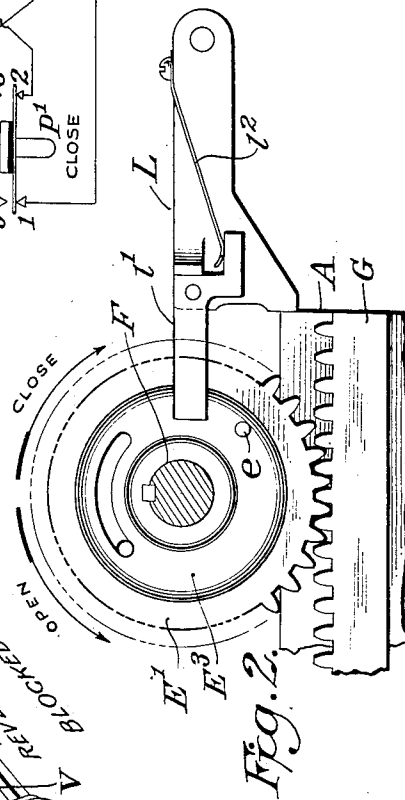
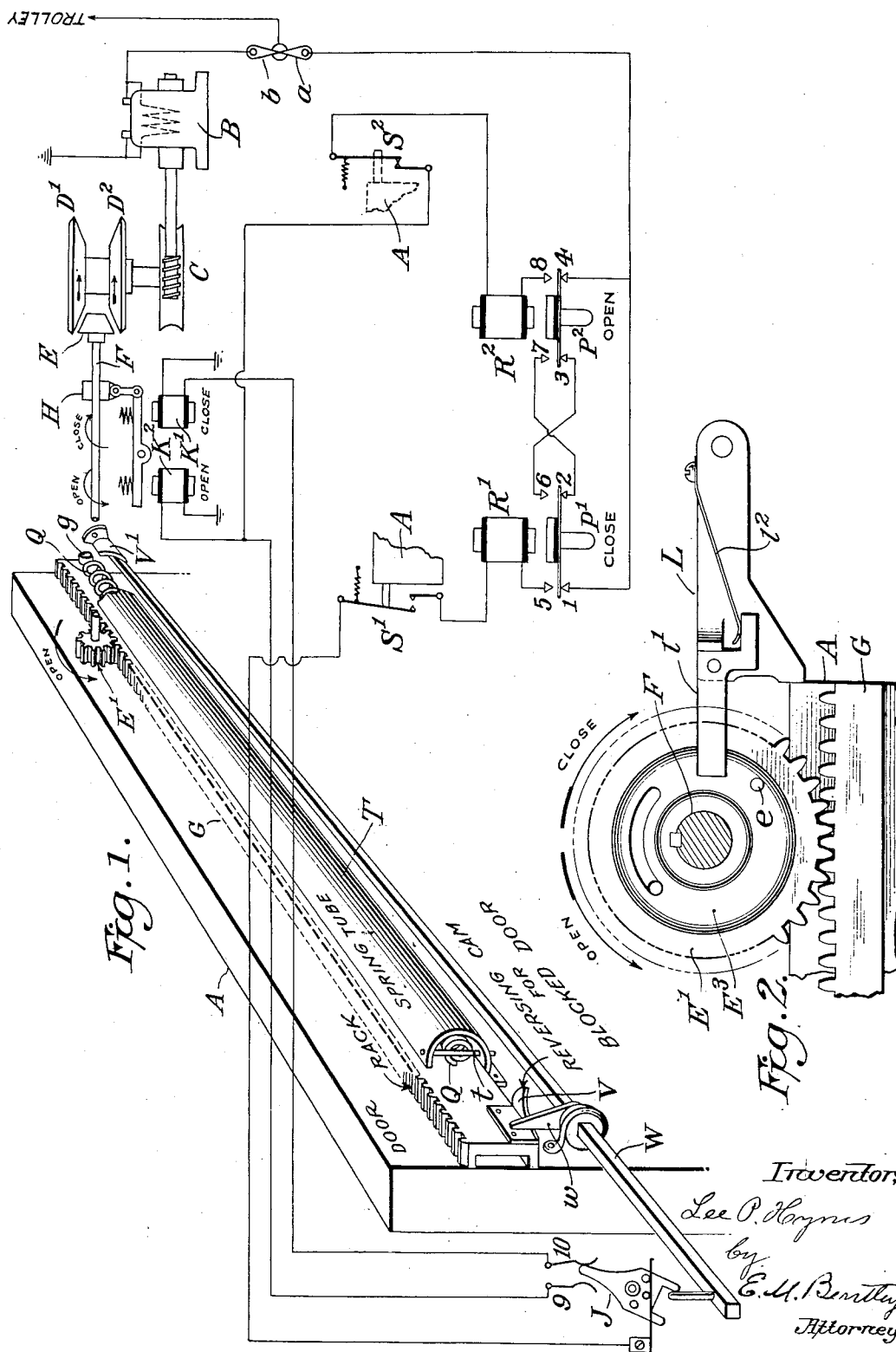
July 1 , 1924.

1,499,735

L. P. HYNES

CAR DOOR OPERATING MECHANISM

Filed Feb. 21, 1919



Inventor,
Lee O. Rogers
by
E. M. Bentley
Attorney.

UNITED STATES PATENT OFFICE.

LEE P. HYNES, OF ALBANY, NEW YORK, ASSIGNOR TO CONSOLIDATED CAR-HEATING COMPANY, OF ALBANY, NEW YORK, A CORPORATION OF WEST VIRGINIA.

CAR-DOOR-OPERATING MECHANISM.

Application filed February 21, 1919. Serial No. 278,555.

To all whom it may concern:

Be it known that I, LEE P. HYNES, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Car-Door-Operating Mechanism, 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 drawings forming a part thereof, wherein—

Fig. 1 shows my apparatus in perspective together with a diagram of the control circuits;

Fig. 2 shows the automatic latch.

My invention relates to the operation of car doors by means of a continuously running, non-reversing motor to which the door is mechanically connected whenever it is to be opened or closed. The connection is established at the volition of the conductor and is interrupted automatically when the door has completed its run. In my present invention the control of this mechanical connection of door and motor is accomplished electrically. I also provide for controlling it automatically in the event of the door being blocked, while I have also provided for locking the door in its closed position.

Referring to the drawing, A is the door and B is an electric motor of the shunt type arranged to run continuously and in the same direction so long as its service is required; it is controlled by a switch *b*. By means of a reducing gear C of the screw and worm wheel type, the motor drives two bevel gears D¹ and D², while a pinion E geared to the door is brought into engagement with one or the other of the gears according as the door is to be opened or closed. Pinion E is on shaft F which also carries a spur pinion E¹ that meshes with a rack G on the door. Shaft F is workable up or down to a slight extent and its right hand bearing H, which normally stands in its middle or neutral position, can be raised by magnet K² or depressed by magnet K¹ to connect pinion E with bevel gear D¹ or bevel gear D². That will obviously rotate shaft F in opposite directions to either close

or open the door. Magnet K¹ will be energized by pushing button P¹ and K² by pushing button P². The former will close a circuit from main switch *a*, back-stop contacts 4 and 3, front-stop contacts 6 and 5, retaining magnet R¹, (which holds in the button) limit-switch S¹, which is then closed, blocked-door switch J, contact 10, magnet K¹ to ground. That will put pinion E against bevel gear D² and the pinion E¹ will move the door in its closing direction until it strikes and opens the limit-switch S¹, breaking the above described circuit and allowing button P¹ to come back to its out or neutral position. When the door is to be reopened, button P² will be pushed, when a similar circuit will be established, including now the retaining magnet R², limit-switch S² and magnet K². That will put pinion E against bevel gear D¹ and the door will be moved in the opposite or opening direction until it opens limit-switch S² and the parts again come back to neutral.

The rack G is secured to the door by the tube T which also contains a coiled spring Q which abuts at one end against pin *g* on the door and at its other end against pin *t* on the tube. Thus the rack drives the door through the intervention of spring Q and if the door is blocked, the rack will continue to move ahead of the door to an extent permitted by the compression of the spring. This overrunning movement of the rack causes cam V to move arm *w* and thereby rotate the square shaft W which has a sliding connection with the door but is journaled on the door frame. That will first throw switch J to contact 9 and then break it away from contact 10, the parts being so constructed that said contact 10 will maintain its engagement with the switch J until the latter is firmly engaged with the contact 9. The current which had therefore been passing from switch J to contact 10 and thence to closing magnet K¹ will now be diverted to contact 9 and spring magnet K². The door will thereupon reverse its movement and open until the switch J is restored against contact 10 by the engagement of arm *w* with stationary cam V¹. Then the door will resume its closing movement and will complete it if the block has been removed; if not, the door reversal will be repeated. By this means the blocking of the door does not cause the blocking of the motor.

When the door is closed it may be automatically locked by the latch L which drops down behind it as shown in Fig. 2. In that arrangement the shaft F is keyed to a hub E³ which has a certain amount of lost motion with respect to pinion E¹ by means of a slot and pin connection therewith. The initial movement of shaft F will merely rotate the hub and thereby bring pin e thereon against the spring lifting-finger l¹ on latch L. That will lift the latch by the time that the lost motion is taken up, and the pinion E¹ now begins to drive the door. When the hub rotates in the opposite closing direction the pin e will merely depress the spring-finger l¹ against the force of its spring l² without affecting latch L which is then riding along the top edge of the door. The foregoing specific illustration of my invention is but one of the various ways in which the invention may be embodied and applied.

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

1. The combination with a door and a non-reversing motor therefor of a non-reversing member driven by the motor, a reversible shaft operatively engaging the door and having a free end movable for selective engagement with said non-reversing member, and an electro-magnetic shifter for the free end of said shaft controlled by the operator and also by the movement of the door.
2. The combination with a door and a non-reversing motor therefor, of a non-reversing member driven by the motor, a reversible shaft operatively engaging the door and having a free end movable for selective engagement with said non-reversing member, a shifter for the free end of said shaft, a controller for said shifter, and retaining means for maintaining said shaft in acting position throughout the run of the door.
3. The combination with a door and a non-reversing motor therefor, of a non-reversing member driven by the motor, a shaft operatively engaging the door and having a free end movable for selective engagement with said non-reversing member, a shifter for the free end of said shaft, retaining means for keeping said shaft in action during the run of the door, and a releaser for said retaining means dependent on the movement of the door.
4. The combination with a door, of a non-reversing motor therefor, a non-reversing member driven by the motor, a reversible shaft operatively engaging the door and having a free end movable for selective engagement with said non-reversing member, a shifter for the free end of said shaft, automatic means for actuating said shifter, a retaining magnet for keeping said connecting device in action during the run of the door, and a controlling circuit-breaker for said magnet dependent on the movement of the door.
5. The combination with a door, of a continuously-operating non-reversing motor therefor, a non-reversing member driven by the motor, a reversible shaft operatively engaging the door and having a free end movable for selective engagement with said non-reversing member, a shifter for the free end of said shaft, electrical controllers both manual and automatic for said shifter, and releasing means to prevent blocking of the motor by blocking of the door.
6. The combination with a door, of a continuously-operating non-reversing motor, a yieldable member carried by said door, means co-operating with said yieldable member by which the door is opened or closed by one direction of motor movement, electrical devices controlling said motor, and means by which said electrical devices may be actuated by continued movement of the yieldable member when movement of the door is blocked.
7. The combination with a door and a non-reversing constantly running motor, of an actuating shaft for the door having a free end, reverse drive means actuated by said motor and co-operating with said shaft, magnetic actuators for shifting the free end of said shaft with respect to said reverse drive means whereby the direction of rotation of the shaft is controlled, and separate circuit closers for controlling said actuators.
8. The combination with a door, of a continuously-operating non-reversing motor therefor, shifting means for both opening and closing the door by one direction of motor movement, magnetic actuators for said means, circuit closers for said actuators and circuit breakers for said actuators operated by the door movement.
9. The combination with a door, of a continuously-operating non-reversing motor therefor, means whereby the door may be opened or closed by one direction of motor movement, electrical devices controlling the motor, means by which the electrical devices may be actuated by continued movement of the door actuating means when movement of the door is blocked, and an automatic lock for the door in its closed position.
10. The combination with a door, of a non-reversing motor therefor, a shifting connector for both opening and closing the door by one direction of motor movement, and a lock for the door operated by the initial door-opening movement of said connector.
11. The combination with a door of a non-reversing motor therefor, shifting means for both opening and closing the door by one direction of motor movement including a rack on the door having a spring connection therewith, and a controller for said

shifting means dependent on the relative movement of the rack and the door.

12. The combination with a door of a non-reversing motor therefor, a shifting
5 connector for both opening and closing the door by one direction of motor movement, and separate control-circuits for said con-

nector each containing a circuit breaker worked by the door movement.

Signed at Albany, county of Albany, and 10
State of New York, this 18th day of February, 1919.

LEE P. HYNES.