F. C. STOWELL.

VENTILATING SYSTEM.

APPLICATION FILED FEB. 6, 1915.

1,303,410.

Patented May 13, 1919.

2 SHEETS—SHEET 1.

Fig. 1

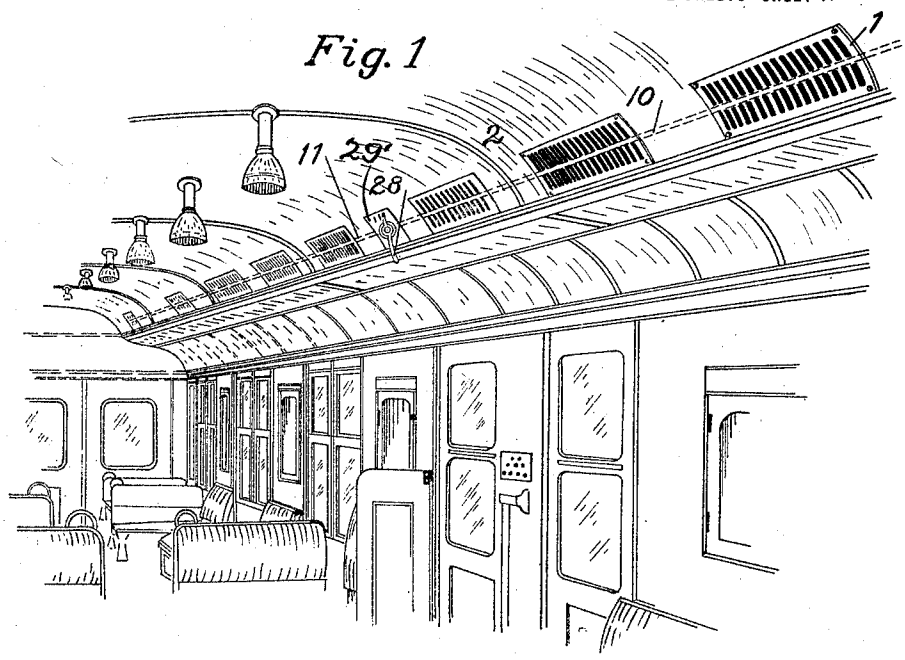
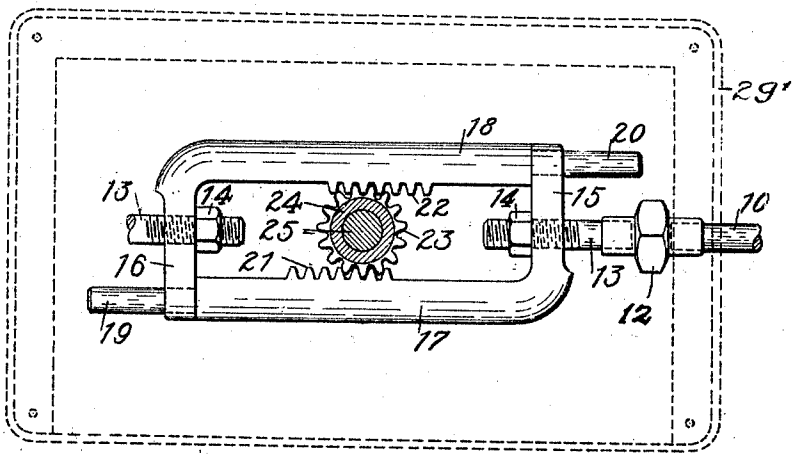


Fig. 2.



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2 SHEETS—SHEET 2.

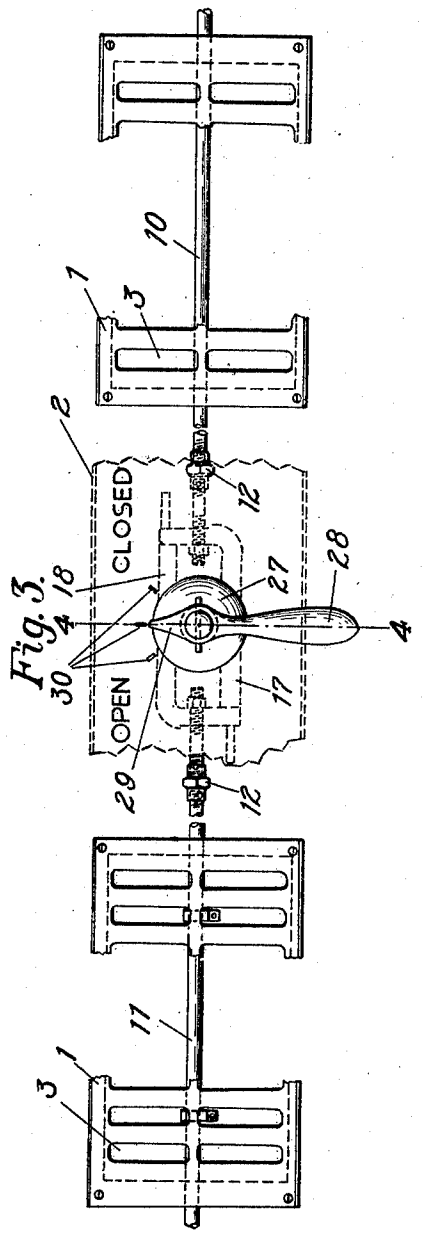


Fig. 3.

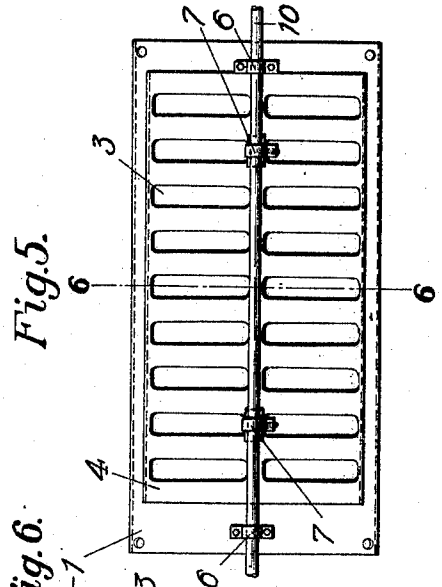


Fig. 5.

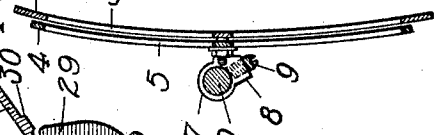


Fig. 6.

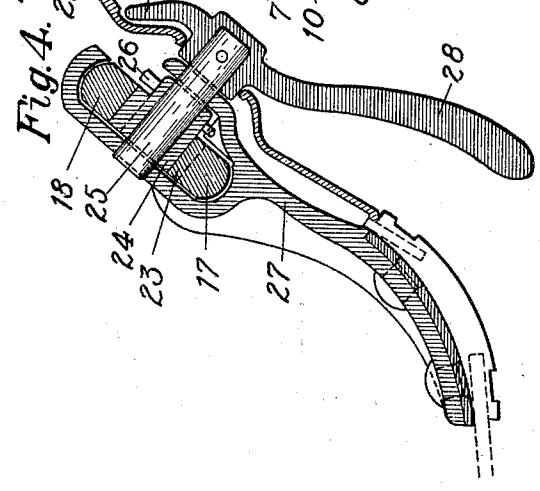


Fig. 4.

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VENTILATING SYSTEM.

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To all whom it may concern:

Be it known that I, FRANK C. STOWELL, a citizen of the United States, residing at Medford, county of Middlesex, Commonwealth of Massachusetts, have invented certain new and useful Improvements in Ventilating Systems, of which the following is a specification.

This invention relates to ventilating systems and particularly to a ventilating system for a moving vehicle.

My present invention is especially designed for use in public conveyances such as street railway cars and in the further treatment of my invention herein, I shall discuss it in its application to this use. This selection however is made simply for the purposes of illustration, and it is understood that the system may be used in any capacity where it would satisfactorily perform its intended functions.

The proper ventilation of public conveyances, such as street railway cars, presents numerous difficulties, and many systems have been devised to meet both general and local conditions. One of the most troublesome problems has been that of securing a uniform temperature throughout the entire car without creating an undue draft in any part of the car. Where this has been attempted by an arrangement of more than one ventilating device it has been a matter of difficulty to secure a uniform and simultaneous operation of the ventilator series, and this difficulty has increased proportionately with the number of ventilators used. Usually each ventilator has been individually operable, that is to say, if it were desired for example, to open all of the ventilators a predetermined degree, the conductor or other person upon whom this duty devolved, was obliged to successively open each ventilator. Inasmuch as these ventilators have usually been located near the roof of the car, the operator either had to climb upon the seat nearest each ventilator and open it by hand or else opened each ventilator with a rod provided for that purpose. The degree of opening was simply a matter of guess-work upon the part of the operator, and consequently a uniform opening of all the ventilators was impossible. Furthermore, ventilators of this type were open to the objection that in starting and stopping or ascending or descending a hill, the sudden movement of the car as a whole frequently caused a movement of the ventilators from their prearranged positions.

To the end, therefore, of providing a ventilating system wherein the ventilator series may be operated simultaneously from a convenient point and wherein the ventilators individually or collectively will not be affected by the movements of the car, I have devised my present invention. In the preferred form of my invention, the ventilators consist of a series of spaced pairs of relatively movable shutters or dampers, each shutter having a plurality of openings adapted to be registered with the similar openings of its coöperating shutter and said series open to the external air, and a centrally located operating mechanism effectively connected with all the shutters midway of the shutter series and effective to move the movable shutter of each shutter pair on one side of it simultaneously in one direction and to simultaneously move the movable shutter of each shutter pair on the opposite side of it in the opposite direction. The shutters are therefore under the control of a single operating device and can not be operated by the movement of the car.

The construction and operation of my device will be more fully described in the specification which follows. In the drawings forming a part of that specification, I have shown as an illustrative embodiment of the principles of my invention a form of ventilator found satisfactory in use. Throughout specification and drawings like reference numerals are correspondingly applied, and in these drawings:

Figure 1 is a partial interior view of a public conveyance equipped with a ventilating system in accordance with my invention.

Fig. 2 is a detail view of a portion of the operating mechanism for the shutter series.

Fig. 3 is a plan view of the single operating handle and showing the relation of the parts.

Fig. 4 is a detail section on the line 4—4 of Fig. 3.

Fig. 5 is a plan view of a shutter pair, and

Fig. 6 is a detail section on the line 6—6 of Fig. 5.

In the application of my ventilating system to such a public conveyance as a street railway car, the shutter pairs are arranged in longitudinal series in the inner wall or "skin" of the car near the roof and at each side of the car. Each shutter pair consists of a base member 1 fixed to the inner wall 2 of the car and having spaced series of elongated slots 3 symmetrically disposed and communicating with ventilating passages through to the exterior of the car, and a movable member 4 slidable longitudinally across the base member 1, whereby to vary the degree of registration of its similar slot series 5 with the slots 3 of the base member. Each fixed member has secured to it at each end a bearing 6 and each movable member has secured to it near each end and between the bearings 6 a bearing 7. The bearings 7 have lateral bosses 8 and the bosses 8 have holes tapped therein and threaded to receive set screws 9.

All the shutter pairs on one side of a predetermined point, usually the center of the car, where the operating mechanism for the shutters is located, are mounted on a single operating rod 10 and all the shutter pairs on the opposite side of the operating mechanism are mounted on a similar rod 11 so that the shutters move simultaneously in opposite directions. The shutter pairs on each side of the intermediate operating mechanism however, are initially arranged to open and close together so that the single movement of the operating device simultaneously opens or closes, all of the shutters, although the shutter series on each side of the operating devices themselves move in opposite directions in this movement.

In the drawings, the shutter series to the right of the operating device in Fig. 3 are carried by the rod 10 and that to the left of said device by the rod 11. Both rods are guided in the bearings 6 and are held in the bearings 7 by the set screws 9 whereby to cause the movable shutters 4 to move relative to the fixed shutters 1 upon a movement of the rods 10 and 11.

The inner ends of the rods 10 and 11 are alined and received in suitable unions 12. The unions 12 carry short threaded rods 13 which are adjustably held by nuts or other suitable fastening devices 14 in the oppositely extended ends 15 and 16 of a pair of spaced rack bars 17 and 18. The purpose of the stems 13 is to permit a slight longitudinal adjustment of the operating rods 10 and 11, without moving the rack bars.

The rack bars 17 and 18 are preferably right angled shaped members arranged in opposition to each other, and have their opposite ends reduced as indicated at 19 and 20 to provide a guide and bearing for the right angle ends 15 and 16. Between their ends the rack bars have opposed series of rack teeth 21 and 22 adapted for engagement by a single pinion 23 mounted between said teeth and effective upon rotation to cause a movement of the rack bars and thus the rods 10 and 11 and shutter series in opposite directions.

The hub 24 of the pinion 23 is fastened to a transverse stub staft 25 in any suitable manner as by a taper pin 26. The shaft 25 is journaled in the upper end of a yoke-like carrier 27 suitably fastened to the car wall with its yoke end embracing the pinion. The outer end of the shaft 25 is pinned in the enlargement of an operating handle 28 which is centrally located between the shutter series.

Beyond its enlargement the handle tapers upwardly and inwardly and terminates in an index pointer 29 adapted to coöperate with a series of three indications which may conveniently be lugs 30 on a plate 29^1 detachably secured to the inner wall 2 of the car whereby to indicate open, closed and intermediate positions of the shutter series.

In use, the shutter series are set up so as to open and close simultaneously upon a movement of the centrally located operating handle. If for example, the handle is in the intermediate position shown in Fig. 3, in which position the slot series of the ventilators are half registered, and it is desired to bring these slots into full registration, the handle is swung to the left (in Fig. 3) until its index pointer comes under the lug 30 at the left in said figure and thus indicates fully open position of the ventilators. The effect of this movement of the handle is as follows. The pinion 23 is rotated through a part of a revolution in a counter clockwise direction and moves the upper rack bar 18 and thus the rod 11 toward the left, thereby carrying the slot series 5 of all the movable shutters 4 mounted on said rod into full registration with the slot series 3 of the fixed shutter members 1 on said rod. At the same time the slot series of all the movable shutters on the rod 10 are moved in an opposite direction into full registration with the slot series of the fixed shutter members on said rod by the engagement of the pinion with the rack teeth of the lower rack bar 17. The opposite movements of the rack bars relative to each other are guided by the bearing of their right angled portions 15 and 16 on the reduced extensions 19 and 20 of each

other, and the movement of the movable shutter members on the fixed members is limited in both their slot covering and uncovering directions by the ends of said movable members contacting the sides of the bearings 6 on the fixed members. These bearings 6 are so mounted with relation to the movable members as not to stop the movement of said members until the slot series of both sets of said members have fully registered with each other, or vice versa, according to the direction of initial movement of the movable members. The hand plate 29[1] being removable affords access to the actuating mechanism behind it.

The ventilating system of the present invention therefore provides for the uniform ventilation of the car by a simultaneous movement of all the ventilators and this movement is imparted by a single lever centrally located and a rack and pinion mechanism operatively connected with the rods carrying said ventilators and operated by the movement of the handle. Obviously, however, other means for imparting simultaneous opposite movement to the shutter operating rods could be used without departing from the spirit and scope of my invention, as for example a toggle connection between the shutter operating rods and operated by the central lever, and I therefore reserve the right to use and regard as within the scope of my invention, this or any other form of shutter operating mechanism wherein simultaneous opposite movement is imparted to the shutters by the movement of an operating device mounted midway between the shutter series.

From this it will be seen that it requires but a very little movement of the operating handle to shift the shutters a distance equal to the width of the vent slots, and that the oppositely acting shutters with their connecting gearing and rods mutually counterbalance each other so that they remain in adjusted position against the tendency of inertia to cause them to close when the car is starting or stopping, or while running on an inclined plane.

Various other modifications in the form and construction of my device may obviously be resorted to within the limits of the appended claims.

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

1. A ventilating system for traveling vehicles, having in combination, a wall or roof structure with a series of vent openings arranged in longitudinal alinement in a common plane, registers for said openings, two series of oppositely movable shutters for said openings and coöperating with said registers, an actuating device disposed intermediately between said series of shutters, and rods, one for each series of shutters, having connection with said actuating device whereby the shutters may be simultaneously opened or closed moving in opposite directions during the opening or closing, said shutters and connecting means mutually counterbalancing each other to overcome the tendency of inertia to close the shutters accidentally during the starting or stopping or traveling of the vehicle on an inclined plane.

2. In a ventilating system, two series of longitudinally alined ventilator shutters mounted in a common plane in the wall or ceiling of a compartment to be ventilated, an operating pinion centrally located between the two series of shutters, a rod for each series of shutters and upon which respective shutters are rigidly and adjustably mounted, each rod having an L-shaped rack in opposing position engaging said pinion, each rack slidably interengaging with the other whereby the racks and their connected rods and shutters are prevented from having relative angular movement.

3. In a ventilating system, an operating rod, a pair of relatively movable ventilator members each having alined bearings for receiving said rod, means for adjustably securing one of said members upon said rod, the rod being movably mounted in the bearing on the other ventilator member, said latter bearings acting as stops to limit the movement of the ventilator, one in the open position and the other in the closed position thereof.

4. In an apparatus of the class described, a pair of coaxial rods upon which are rigidly, detachably and adjustably mounted respective series of ventilator shutters arranged in longitudinal alinement, fixed registers for the shutters, means for actuating the rods in opposite directions simultaneously, and connections between said rods and said means for adjusting the relation of the shutter to said means and to the registers, the respective rods and shutters counterbalancing each other.

5. In a ventilating system of the class described, a pinion having an operating lever, opposed racks having each a perpendicular arm interengaging slidably with the adjacent end of the opposite rack, a pair of coaxial ventilator operating rods, connecting spindles adjustably mounted in the angular arms of said racks and the unions connecting the respective rods with said spindle.

6. In a ventilating apparatus, a plurality of ventilator operating rods each having a rack, a pinion operatively engaged by said racks and provided with an operating spindle, a lever secured in one end of said spindle, and an integral bearing for said spindle having parallel spaced journal arms one on

each side of the pinion, one of said arms being brought over a rack projecting from a respective rod, and a guide formed between the arms for the lower rack projecting from the other rod.

7. In a ventilating system for moving vehicles, a pair of ventilators, controlling connections for each ventilator movable in the line of travel of the vehicle, and a common operating mechanism therefor whereby the inertia of each ventilator and connection is balanced to remain unaffected by the starting and stopping movements of the vehicle.

In testimony whereof I affix my signature.

FRANK C. STOWELL.

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