April 17, 1934. W. J. PINE ET AL 1,955,088

VENTILATOR FOR CARS

Filed Dec. 8, 1930

Fig. 1.

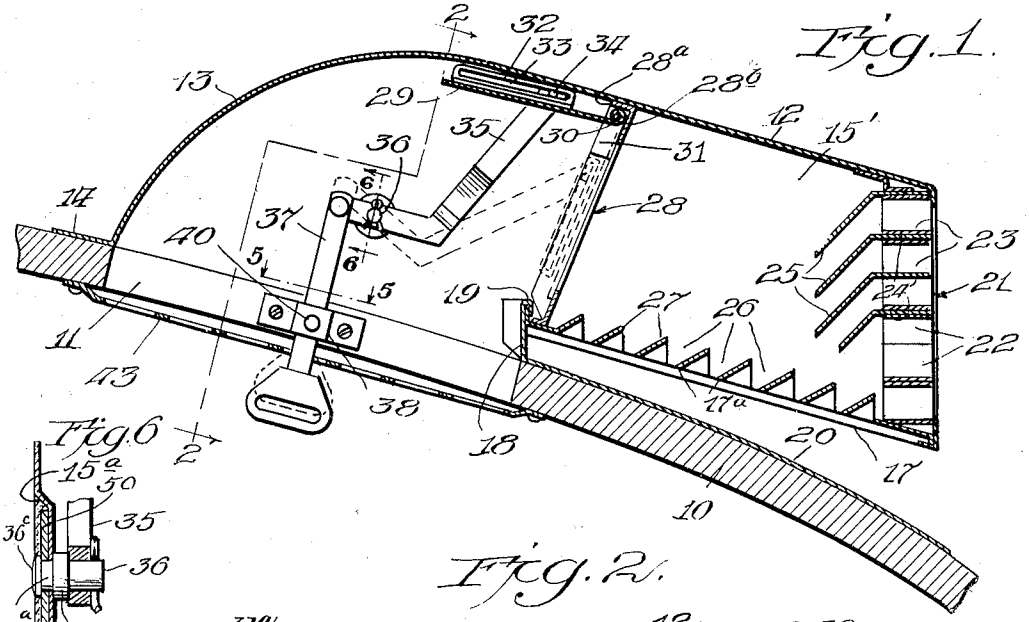


Fig. 6

Fig. 2.

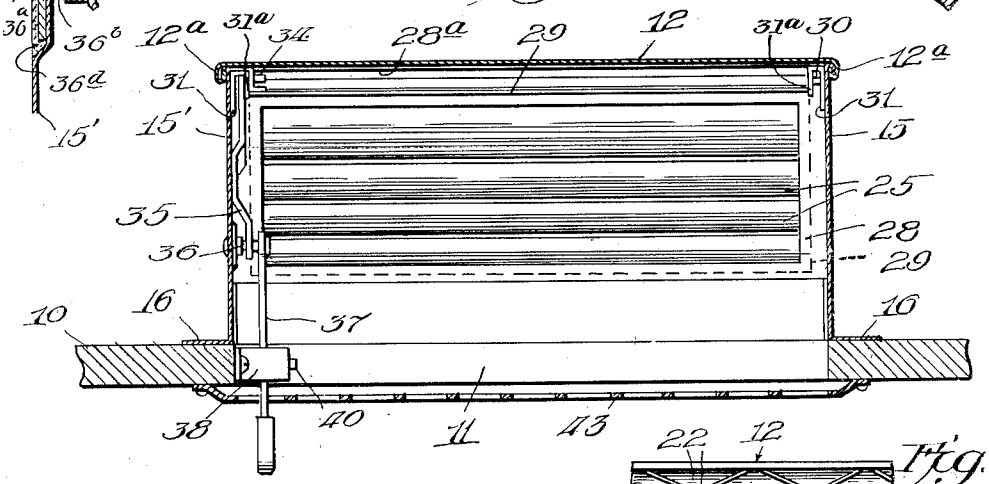


Fig. 3.

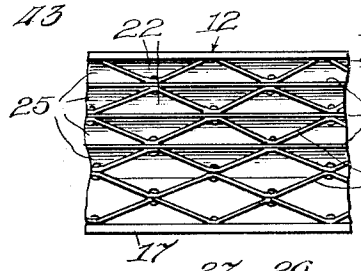


Fig. 5.

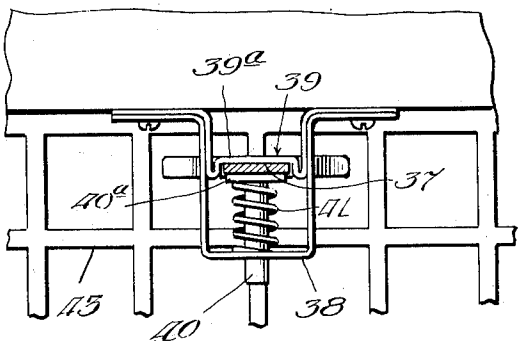
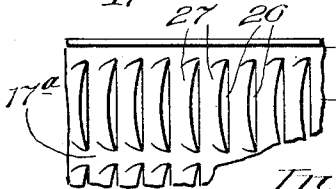


Fig. 4.



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VENTILATOR FOR CARS

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11 Claims. (Cl. 98—20)

Our invention relates to ventilators, and has to do more particularly with the type of ventilator adapted to be mounted on the top of a street or railroad car and to operate by the aspirating effect of the movement of the car through the atmosphere to draw air from the interior of the car so that it may be replaced with fresh air.

In ventilators of this general character, as heretofore constructed, under certain weather and operating conditions, there has been some tendency for air, rain, small particles of dirt, etc., to enter the car through one or more of the ventilators with which the car is usually equipped. Also, in certain of such prior structures, shutters of the overlapping panel type have been employed at the juncture between the car and the ventilator for regulating ventilation; however, such shutters are objectionable in that they do not provide a positive closure in closed position of the same and, under the foregoing weather and operating conditions, when the shutter is closed, dirt, rain, snow, etc., tends to collect upon and behind the same so that when it is opened such dirt, etc., falls into the car.

One of the objects of our invention is to provide a highly efficient ventilator of the foregoing character which eliminates all the foregoing objectionable features.

Another object is to provide, under conditions when the car is both in motion and at rest, for the positive regulation of the ventilation of the interior of the car without dirt, weather, etc., getting into the interior of the car; which arrangement is such that dirt, etc., does not tend to collect upon the regulating means in the closed position of the latter.

A more specific object is to provide a ventilator having shut-off means of the flap valve type which is readily adjustable and which is located within the ventilator casing at a point remote from the car-ventilator opening, which valve is so constructed and associated with the remainder of the ventilator structure that dirt, etc., which may tend to collect upon the same is deflected outwardly toward the ventilator outlet, and the valve structure may be closed and opened at any desired interval, under all operating conditions, without discharging dirt, etc., into the interior of the car.

In the use of ventilators of this character, there are times when the trainmen may have occasion to walk or stand upon the ventilator casing in which cases the ventilator may be distorted or otherwise injured. Another object of our invention is to prevent injury to the ventilator in such cases, and to strengthen the ventilator as a while, by providing on the interior of the casing a reenforcing means; and to the end of economy and simplicity we, preferably, employ part, at least, of such means as a seat upon which the regulating valve seats in its closed position.

An additional object is to provide a strong and durable ventilation valve operating structure which is capable of minute adjustments to suit all ventilating conditions, and which may be readily and quickly controlled from the interior of the car.

Other objects and advantages will become apparent as this description progresses and by reference to the drawing wherein,—

Figure 1 shows a part of the curved roof of a car with one form of our invention applied thereto, the roof and ventilator being shown in transverse section and the ventilator being shown in open position in full lines and in closed position in dotted lines.

Fig. 2 is a section taken substantially on line 2—2 of Fig. 1;

Fig. 3 is an elevational view of a portion of the open side wall;

Fig. 4 is a view similar to Fig. 3 of the open bottom wall;

Fig. 5 is an enlarged part-sectional view taken at a point indicated at line 5—5 of Fig. 1; and

Fig. 6 is an enlarged section taken substantially on line 6—6 of Fig. 1.

Referring particularly to the drawing, the ventilator may be mounted on the car roof 10 having a ventilating opening 11. The ventilator, as shown, takes the form of a, preferably, sheet metal casing having a horizontal top wall 12 extended laterally into a curved side wall 13 which is attached to the car roof by flange 14. The ends of the casing are formed by vertical plane walls 15, 15′ having the general elbow-shape of the ventilator and secured to the top wall 12, preferably, by lap joints 12^a and to the roof 10 by their respective flanges 16, 16′. A bottom wall 17 extending the width of the ventilator (Fig. 1) is secured to the end walls 15, 15′, preferably, by suitable lap joints and to the inner end of a vertical neck wall 18 by a similar joint 19. The neck wall 18 has a substantial flange 20 secured to the car roof holding the bottom wall 17 spaced from the car roof as shown.

The open outer side 21 of the casing is divided into a plurality of transverse passageways 22 by cross strips 24 and in these passageways are grating strips 23 (Fig. 3). This structure is similar

to that described in our pending application Serial No. 427,095, filed February 10, 1930, for Ventilators for cars. More particularly, the outer edges of the honeycomb structure formed by the strips 23 and 24, when the car is in motion, form numerous aspirating edges, the motion of which through the atmosphere exerts a suction on the air inside the ventilator.

The cross strips 24 are extended integrally inward and downward to provide deflectors 25 which deflect dirt, air, rain, etc. (which might under certain conditions tend to enter the ventilator through openings 22) toward the bottom wall. The bottom wall 17 is provided with a plurality of rows of openings 26 which may be formed by slitting the bottom wall in such a way as to provide rib-like surfaces 17^a separating the several rows. We further shape the material at the rear of each such opening to provide an up-standing, forwardly-inclined fin or deflector 27 at the inner edge of each opening (Figs. 2 and 4). Wherefore, rain, snow, dirt, etc., which may enter the openings 22 is deflected by members 25 toward the bottom openings 26 and is discharged therethrough.

To strengthen the ventilator casing to avoid distortion of and injury to the same in the event that trainmen should walk of stand on it, and to generally strengthen the structure as a whole, we provide a strengthening member 28 of L-shape in cross-section passing entirely around the interior of the casing adjacent the inner end of the neck wall 18. The horizontal web portion 28^a of this member is secured to the respective wall surfaces by rivets or any other suitable fastening means. The vertical web portion 28^b of this member is of sufficient length to provide a substantial inwardly-projecting seat for the regulating valve 29.

The regulating valve 29 is of the flap type having the general outline shape of the strengthening member 28. A supporting rod 30 is attached to the upper edge of this valve and its opposite, projecting ends are rotatably mounted in the inner and shorter legs 31^a of inverted U-shaped supports 31 mounted on the opposite end walls 15, 15', preferably, within the angle of the member 28 (Fig. 2).

To operate the valve 29, we provide along its one edge an angle plate 32 the vertical web of which has an elongated slot 33 in which the pin 34 of an operating crank 35 moves. The shorter arm of the crank 35 is rotatably supported upon a wall-carried pin 36 and it is rotated about this pin by an operating lever 37 pivoted to the free end of such arm. The lever 37 is confined between the spaced bases of two U-shaped members 38, 39 and is slidably held within the depressed base portion 39^a of the U-member 39 by the head 40^a of a spring-pressed plunger 40. More particularly, we provide a spring 41 which surrounds the stem of plunger 40 and is confined under tension between the base of the U-member 38 and the head 40^a of the plunger, the latter having its stem slidably mounted in an opening in the base of the U-member 38. With this structure, inward and outward slide movement of the lever 37 swings crank 35 to open and close the valve 29 against the vertical web of member 28. The spring-pressed plunger readily permits of this sliding of the lever 37, but the plunger head frictionally grips the lever under sufficient tension to hold it and the valve in any position to which they may be moved.

We strengthen the valve operating structure by supporting the crank pin 36 as shown in Fig. 6. This arrangement also renders this structure more positive in action as well as providing a leak-proof pin mounting. Specifically, we depress the end wall 15' inwardly to form a circular space 15^a in which is received a relatively thick washer 50. This washer approximately fills such space. Aligned openings are provided in the washer and depressed wall surface to receive the reduced stem 36^a of the pin 36 with its enlarged head portion 36^b seated on the inner surface of wall 15'. The end of the pin which projects through the washer is upset or riveted as at 36^c rigidly fixing the parts together. Solder, or the like may be applied at 36^d to completely seal the washer in place to render the pin mount weather and air proof.

It will be noted that the valve 29 seats flush on all sides against the member 28 when it is closed. Thus, we provide for a complete shut-off of the ventilator when that becomes desirable. Or, the valve may be adjusted to an indefinite number of positions for accurately controlling ventilation according to conditions within the car. The car ventilating opening 10 may be covered by any suitable form of perforated member such as the grating 43, or a screen or the like.

When the valve 29 is closed, any gusts of air, rain, sleet, snow, dirt, etc., which might find its way into the ventilator as far as the valve (either when the car is in motion or at rest) does not tend to collect upon the valve, but is deflected toward the ventilator outlets 22, bottom openings 26 or into the space immediately outward of the vertical web of member 28.

In the use of the foregoing structure when the car is traveling in either direction, the imperforate end walls 15, 15' present a closed wall surface to the pressure of the atmosphere. The motion of the edges of the structure in both the walls 21 and 17 causes an aspirating effect which exerts an exhausting or suction action upon the air within the ventilator so that there is a constant outflow of heated and used air from the car. If there is a lateral wind driving against the open side or wall 21 and it is of sufficient force to overcome the suction effect above mentioned and to drive gusts of air, water, dirt, etc., through the openings 22, the deflectors 25 coupled with the suction effect of the bottom openings 26 and the deflection action of the deflectors 27 discharges the same through such bottom openings preventing their entry into the car. The foregoing takes place when the car is either in motion or at rest. A fine degree of ventilation regulation under all these conditions is provided by the valve 29 which is readily operable from inside the car. Furthermore, the valve 29 may remain closed for long periods of time without danger of dumping dirt, etc., into the car when the valve is opened.

While we have shown only one form of our invention, it is to be understood that various changes in details and arrangements of parts may be made without departing from the spirit and scope of our invention as defined by the claims which follow.

We claim:

1. In a ventilator of the class described having a casing with a vertical and a horizontally extending connected portion, the former portion being adapted to be connected to the car ventilating opening and the latter portion communicating directly with the atmosphere, aspirating means associated with the side and bottom of

said horizontal portion, which means include deflector elements for discharging foreign objects accidentally entering the casing and a valve adjustably mounted in said casing adjacent the juncture of said vertical and horizontal portions remote from said car and atmosphere connections and adapted to be moved toward said horizontal portion to close communication between said horizontal and vertical portions, and means adapted to extend within the car for operating said valve.

2. In a ventilator of the class described having a casing with a vertical neck portion connected to the car ventilating opening and a four-walled, closed-end horizontal portion extending from said neck and connected directly to atmosphere at the side and bottom thereof, aspirating means in said horizontal portion, a seat member extending around and secured to the four walls of said horizontal portion adjacent the juncture of said neck and horizontal portions, a flap valve mounted in said casing adjacent said seat member and adapted to swing in opposition to the suction in said horizontal portion as it is opened, said valve being of sufficient dimensions to seat against said member to completely shut-off communication between said neck and horizontal portions, and means accessible within the car for operating said valve to swing the same to any desired degree with respect to said seat member.

3. In a ventilator of the class described, a casing having a vertical portion connected at one end to the car ventilating opening a horizontal portion connected to the other end of said vertical portion, aspirating means in the bottom and side of said horizontal portion adapted to create a suction effect therein, and valve means within said casing located at a point remote from the car ventilating opening for controlling communication between said vertical and horizontal portions, and means accessible within the car for operating said valve, said means being movable in the direction of suction to close said valve and including adjustable operating connections of friction type effective to hold said valve in various positions against closing movement by the suction acting thereon.

4. In a ventilator of the class described, a casing having a vertical portion and a horizontal portion, said horizontal portion having closed end and top walls and open bottom and side walls, aspirating means associated with said open walls adapted to create a suction effect in said ventilator, a valve located inwardly of said aspirating means and adjacent the juncture of said vertical and horizontal portions remote from the car ventilating opening, and means accessible within said car for operating said valve.

5. In a ventilator of the class described, a comparatively thin-walled casing having a vertical portion and a horizontal portion, the vertical portion being adapted to connect directly to the car ventilating opening and the horizontal portion connecting directly with the atmosphere at its outer side and bottom only in a direction at substantially right angles to the direction in which the ventilator is moved, aspirating means in said horizontal portion a strengthening member banding the interior wall surface of said horizontal portion adjacent its juncture with said vertical portion, a plane surface flap valve mounted in said casing to swing within said vertical portion toward and from said member and to seat thereon to close communication between said two casing portions, and means for operating said valve.

6. A ventilator of the class described having closed front, rear and top walls, a lateral and a bottom opening, aspirating partitions across said lateral opening, deflectors arranged across the lateral opening and inclined toward the bottom opening, and deflection means associated with the bottom opening and inclined toward the lateral opening.

7. A ventilator of the class described having closed rear, front and top walls, an open side wall having aspirating partitions therein, a bottom wall having a plurality of openings therein, deflection means associated with said partitions and directed toward said bottom openings, and deflection means associated with said bottom openings and directed toward said partitions.

8. A ventilator of the class described having closed rear, front and top walls, an open side wall having aspirating partitions therein, a bottom wall having a plurality of openings therein, deflection means associated with said partitions and directed toward said bottom openings, and deflection means associated with the rear edge of each of said bottom openings and directed toward said partitions.

9. A ventilator of the class described having closed rear, front and top walls, an open side wall having aspirating partitions therein, a bottom wall having a plurality of openings therein, deflection means associated with said partitions and directed toward said bottom openings, the material between said bottom openings being shaped to provide at the rear of each said bottom opening a deflecting wall projecting toward said partition deflection means.

10. In a ventilator, a relatively thin-walled, ventilating casing having one of its walls pressed inwardly to provide a depression therein, said casing having an inlet and an outlet, means for controlling communication between said inlet and outlet which includes a valve and a valve operating member, a pin pivotally supporting said member, and a mounting for said pin comprising a flat disk mounted in said depression, said pin having an enlarged head portion and a reduced stem part the latter of which extends through said casing wall and said disk with its projecting end riveted in place, and solder sealing and fixing said disk and wall together.

11. In a ventilator, a casing constituting a ventilating conduit and having a relatively thin wall, a valve in said casing, an operating arm for said valve, and means for pivotally mounting said arm on said thin casing wall which comprises, a depression in said wall forming a space, a flat disk seated in said space and substantially filling the same, and a pin having a stem with an integral head at its mid-portion, one end of said stem projecting through said wall and disk where it is riveted to said disk with said head seated against said wall to hold the parts rigidly together, the free end of said stem supporting said arm, and sealing means applied around said disk intimately joining the disk to said casing wall.

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