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VENTILATOR

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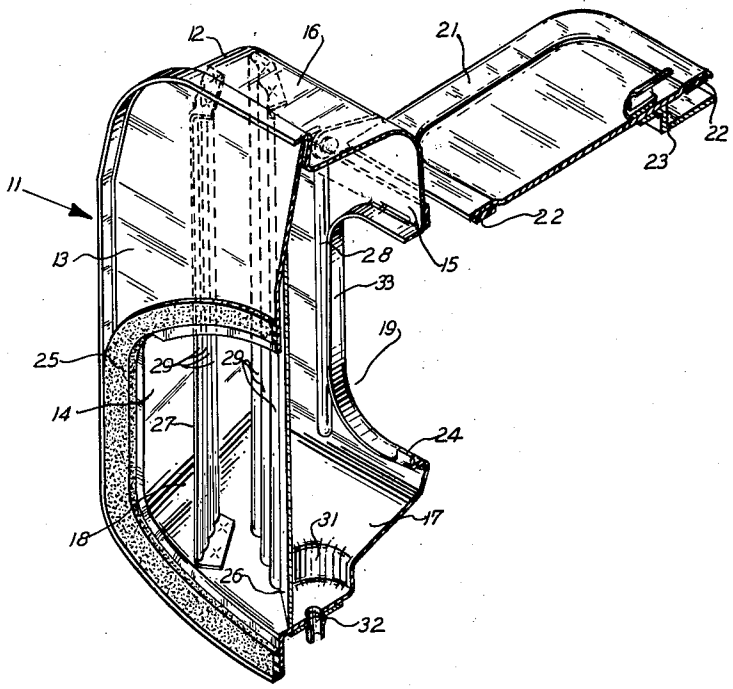


FIG. 1

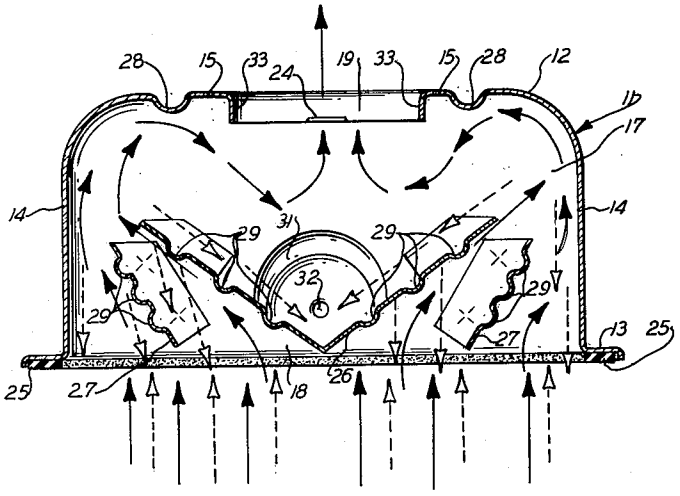


FIG. 2

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VENTILATOR

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This invention relates to a fresh air intake ventilator particularly adapted for use in motor vehicle bodies.

Fresh air intake ventilators, particularly those positioned on a vehicle body to receive intake air through the ram effect of vehicle movement, must meet certain performance requirements. Such ventilators must be able to supply a maximum quantity of air at all vehicle speeds; they must effectively separate water from the entering air so that no water will enter the vehicle while it is in motion in inclement or rainy weather; and they must effectively prevent water entry during manual or automatic vehicle washes.

The water separation problem is particularly critical. It is not difficult to accomplish satisfactory water separation at the expense of the quantity of air flow through the ventilator or by increasing the size of the ventilator. It is extremely difficult to accomplish water separation with a relatively shallow ventilator which is required to furnish a large quantity of ventilation air.

It is an object of the present invention to provide an air intake ventilator of extremely shallow depth but capable of achieving air quantity and water separation comparable with much larger systems.

The ventilator embodying the present invention comprises a ventilator shell in which are positioned primary and secondary baffles. Air and water enter the ventilator assembly at a velocity dependent upon car speed and are turned through a substantial angle by the primary and secondary baffles. In turning, a portion of the water in the air impinges upon the baffles and drains out the front of the ventilator. The air and remaining water continue to the side of the duct where flow is again turned. As before, additional water impinges on the side of the ventilator and is drained off. The air and what little water is left enters a low pressure area formed immediately behind the primary baffle where air flow is again turned through a substantial angle and discharged into the vehicle. The remaining water is removed from the air in the low pressure area behind the primary baffle. Water is discharged from the ventilator through a drain. The baffles are arranged to prevent passage of water through the ventilator when the vehicle is being washed.

Further objects and advantages of this invention will become more apparent as this description proceeds particularly when considered in conjunction with the accompanying drawings in which:

FIGURE 1 is a perspective view of a ventilator embodying this invention with a portion broken away to more clearly show the details of construction.

FIGURE 2 is a transverse cross sectional view of the device shown in FIGURE 1.

Referring now to the drawings in detail, a ventilator embodying this invention is shown generally at **11**. Ventilator **11** has a shell **12** consisting of front **13**, side **14**, rear **15**, top **16** and bottom **17** walls. Front wall **13** is formed with an air inlet opening **18**. Rear wall **15** is formed with an air outlet opening **19**.

The quantity of air flow through ventilator **11** is controlled by the vent door **21**. Vent door **21** is pivotally supported in a suitable manner on rear wall **15** for movement from the open position shown to a closed position in which air flow through ventilator **11** is prevented. The outer perimeter of door **21** is provided with the

resilient gasket **22** which forms an effective air tight seal with the marginal portion of outlet opening **19** when door **21** is closed. Door **21** is formed with a rotatable latch member **23** which coacts with the upturned tab **24** on back wall **15** to lock door **21** in the closed position.

Front wall **13** of shell **12** is adapted to be suitably secured to one of the outer body panels of the passenger compartment. Inlet opening **18** is formed to be positioned in registry with a similar opening formed in the body sheet metal. A resilient gasket **25** is bonded or otherwise secured to the marginal portion of inlet opening **18** to provide an air seal between the front wall **13** and the adjacent body sheet metal. The contour of front wall **13** is constructed to conform to the shape of the adjacent body sheet metal.

The internal construction of ventilator **11** will now be described in detail with particular reference to FIGURE 2 wherein the path of the air flow through the ventilator **11** is shown. The direction of the incoming air flow is diverted by a V-shaped primary baffle **26** and angularly disposed secondary baffles **27**. Baffles **26** and **27** extend vertically for the full height of shell **12** and are suitably secured, as by spot welding, at their upper ends to top wall **16** and at their lower ends to bottom wall **17**.

Assuming that door **21** is open, outside air will enter inlet opening **18** at a rate dependent upon the velocity of vehicle travel. In rain or heavy fog, water droplets will also enter ventilator **11**. In FIGURE 2 the path of air travel is illustrated by the solid arrows. The path traversed by the water is shown by broken arrows. A portion of the entering water droplets impinge upon and are deposited on baffles **27** and the leading face of baffle **26**. The flow of the entering air and the remaining water droplets is turned by the leading face of primary baffle **26** and secondary baffles **27** through a substantial angle and directed against side **14** and rear **15** walls of shell **12**. Further water droplets will impinge against and be deposited on walls **14** and **15**. The conformation of side **14** and rear **15** walls again diverts the flow through a substantial angle and directs the flow toward the trailing face of primary baffle **26**. The ribs **28** formed in rear wall **15** aid in so directing the flow. The bulk of the remaining water droplets will impinge upon the trailing edge of baffle **26** and will be deposited thereon. The conformation of the trailing face of primary baffle **27** again alters the direction of air flow turning it through a substantial angle and directing the substantially dry air out through outlet opening **19** into the interior of the vehicle.

Baffles **26** and **27** are formed with ribs or corrugations **29** which, in addition to assisting in the water separation by creating turbulence in the air flow, prevent water deposited on baffles **26** and **27** from flowing to the trailing edges of the baffles and re-entering the air stream.

The vertical disposition of the baffles **26** and **27**, side wall **14** and rear wall **15** causes the water droplets deposited thereon to flow down toward the bottom shell wall **17**. Bottom wall **17** of shell **12** is canted downwardly toward the inlet opening **18**. Water deposited on secondary baffles **27** and the leading face of primary baffle **26** and side walls **14** flows down onto bottom wall **17** and out inlet opening **18** as shown by the arrows. Water deposited on a trailing face of primary baffle **26** and on back wall **15** will be channeled toward the bight of primary baffle **26**. A well **31** is formed in this area of bottom wall **17** where the water will collect. The water is drawn out of the spigot **32** contained in well **31** through a flexible conduit (not shown) to be expelled below the vehicle body. It should be noted that at high velocity the air flow may tend to cause the water which collects on bottom wall **17** to flow upward against the incline of wall **17** toward back wall **15**. Outlet opening **19**, although axially aligned with inlet open-

ing 18 is raised slightly with respect to bottom wall 17 and is provided with an upwardly extending lip 33 to prevent any collected water from flowing from bottom wall 17 into the vehicle interior under this condition.

As may be seen, the conformation of shell 12 and baffles 26 and 27 directs the air flow through a labyrinthine air flow path which centrifuges water droplets from the air in three stages. The last stage of separation takes place in the bight of V-shaped primary baffle 26. The air flow creates a partial vacuum in this area thus increasing the efficiency of the water separation in the final stage.

The positioning of baffles 26 and 27 also prevent a straight line flow from inlet 18 to outlet 19 prohibiting the entry of a stream of water to the vehicle interior even though the water flow may be directed into opening 18.

It will be understood that the invention is not to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of the invention, as defined in the appended claims.

We claim:

1. A ventilator adapted to be mounted in a vehicle body in a position to receive intake air through the ram effect of vehicle movement,

said ventilator comprising:

a shell having front, rear, top, bottom and side walls with the front and rear walls having apertures therein,

said front wall aperture comprising an air inlet opening and said rear wall aperture an air outlet opening when in vehicle body mounted position of said ventilator;

a water separation baffle extending between said top and bottom walls,

said baffle being substantially V-shaped with the apex of the V in juxtaposition to said front wall and substantially vertically bisecting said air inlet opening,

each leg of said V-shaped baffle extending at an acute angle to said front wall and terminating in spaced relationship to a respective side wall of said shell to form an air passageway around the terminal end of each leg,

the extent of each leg being such that said baffle prevents straight line air flow from said air inlet opening to said air outlet opening,

the abrupt change of direction resulting from the impingement of an air stream on said baffle causing air-water separation and air flow diversion to said side walls and the further change of direction resulting from air flow around said baffle to said air outlet providing further air-water separation,

and a water outlet located in said bottom wall within the bight of said V-shaped baffle providing for drainage of water from said shell.

2. A ventilator according to claim 1 in which said shell is substantially rectangular in cross section with the width of the front and rear walls being substantially greater than the depth of the side walls.

3. A ventilator according to claim 1 in which said baffle is formed with a plurality of corrugations extending in a direction parallel to the apex of said baffle,

said baffle corrugations increasing the turbulence of air flow thereover to more effectively cause separation of water from the air stream.

4. A ventilator according to claim 2 in which said baffle is formed with a plurality of corrugations extending in a direction parallel to the apex of said baffle,

said baffle corrugations increasing the turbulence of air flow thereover to more effectively cause separation of water from the air stream.

5. A ventilator adapted to be mounted in a vehicle body in a position to receive intake air through the ram effect of vehicle movement,

said ventilator comprising:

a shell having front, rear, top, bottom and side walls with the front and rear walls having apertures therein,

said front wall aperture comprising an air inlet opening and said rear wall aperture an air outlet opening in vehicle body mounted position of said ventilator;

water separation baffles extending between said top and bottom walls comprising primary and secondary baffles,

said primary baffle being substantially V-shaped with the apex of the V in juxtaposition to said front wall and substantially vertically bisecting said air inlet opening,

each leg of said V-shaped primary baffle extending at an acute angle to said front wall and terminating in spaced relationship to a respective side wall of said shell to form an air passageway around the terminal end of each leg,

the extent of each leg being such that said primary baffle prevents straight line air flow from said air inlet opening to said air outlet opening,

said secondary baffles comprising a baffle plate located between each leg of said V-shaped primary baffle and the respective side wall of said shell to direct air flow into the respective passageways around the ends of said V-shaped primary baffle legs,

the abrupt change of direction resulting from the impingement of an air stream on said primary and secondary baffles causing air-water separation and air flow diversion to said side walls and the further change of direction resulting from air flow around said primary baffle to said air outlet opening providing further air-water separation,

and a water outlet located in said bottom wall within the bight of said V-shaped baffle providing for drainage of water from said shell.

6. A ventilator according to claim 5 in which said shell is substantially rectangular in cross section with the width of the front and rear walls being substantially greater than the depth of the side walls.

7. A ventilator according to claim 5 in which said primary and secondary baffles are formed with a plurality of corrugations extending in a direction parallel to the apex of said V-shaped primary baffle,

said corrugations being effective to increase the turbulence of air flowing thereover to further increase the air-water separation effect of said baffles.

8. A ventilator according to claim 6 in which said primary and secondary baffles are formed with a plurality of corrugations extending in a direction parallel to the apex of said V-shaped primary baffle,

said corrugations being effective to increase the turbulence of air flowing thereover to further increase the air-water separation effect of said baffles.

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