July 12, 1938. E. J. NEY 2,123,287

COMBINATION VENTILATOR

Filed Nov. 22, 1934 2 Sheets-Sheet 1

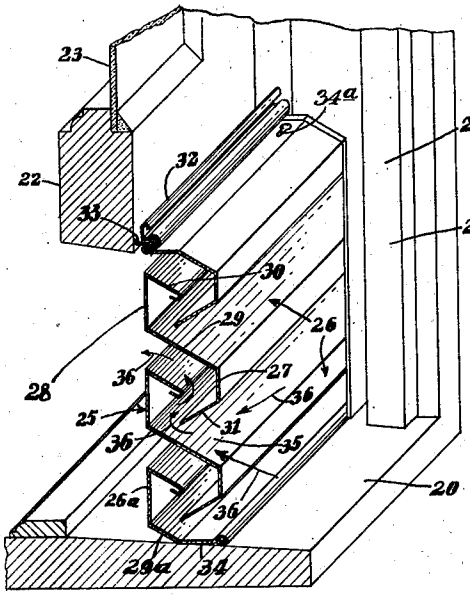

Fig. 1.

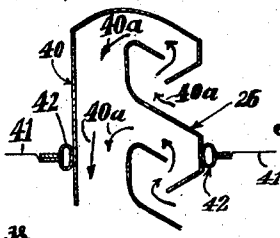

Fig. 3.

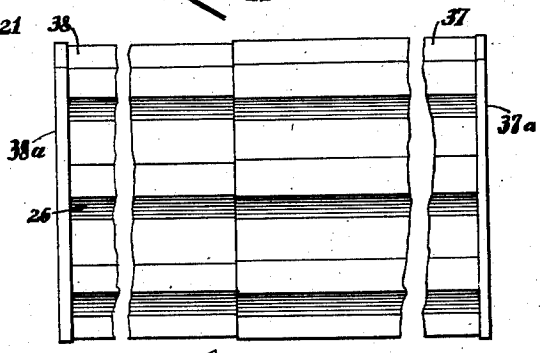

Fig. 2.

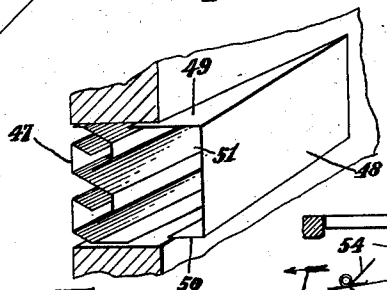

Fig. 5.

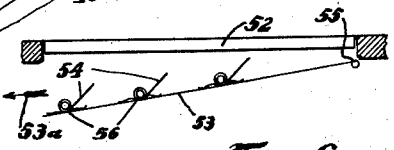

Fig. 6.

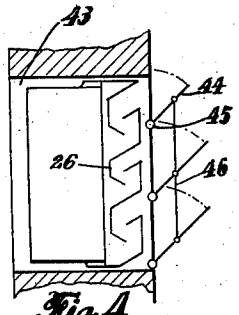

Fig. 4.

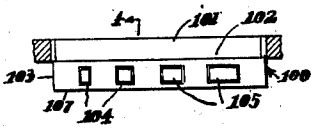

Fig. 12.

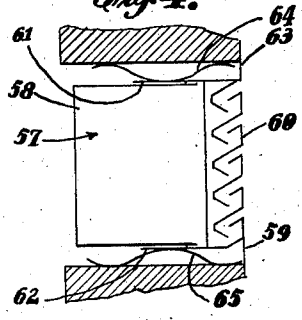

Fig. 7.

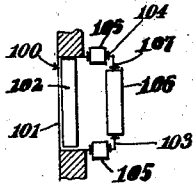

Fig. 13.

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July 12, 1938. E. J. NEY 2,123,287

COMBINATION VENTILATOR

Filed Nov. 22, 1934 2 Sheets-Sheet 2

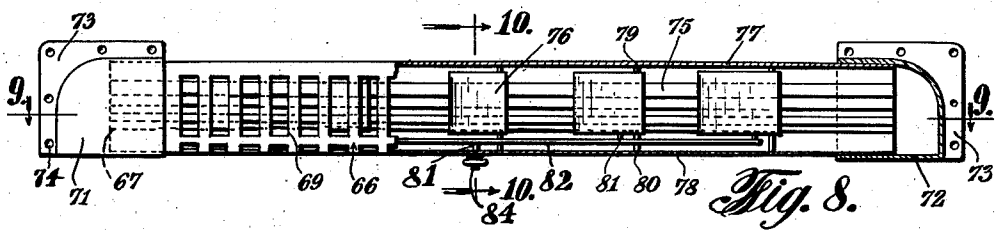

Fig. 8.

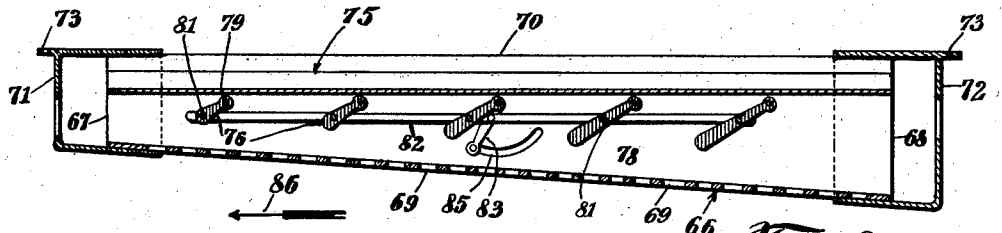

Fig. 9.

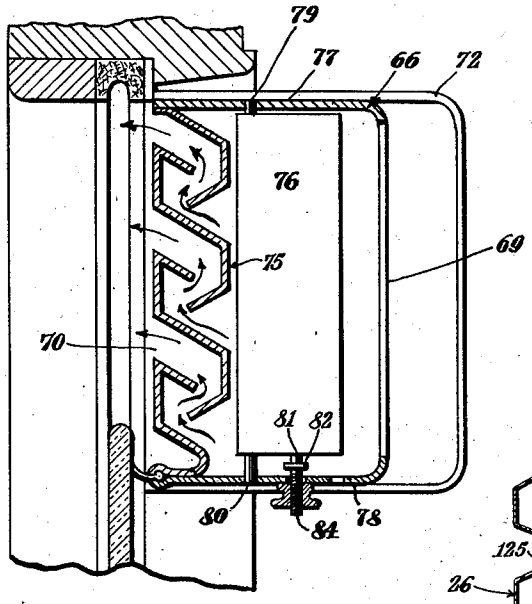

Fig. 10.

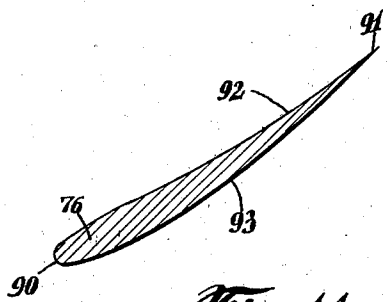

Fig. 11.

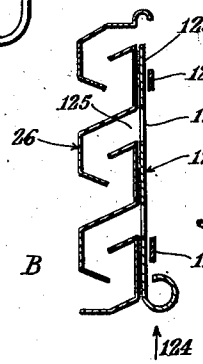

Fig. 14.

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Patented July 12, 1938 2,123,287

UNITED STATES PATENT OFFICE

2,123,287

COMBINATION VENTILATOR

Eugene J. Ney, New York, N. Y.

Application November 22, 1934, Serial No. 754,289

7 Claims. (Cl. 98—99)

This invention relates to ventilators, and particularly to novel combinations in ventilator elements and novel structures thereof, and it also has relation to and represents improvements over my co-pending application for ventilators filed February 18, 1932, Ser. No. 593,760.

The main objects of my present invention are the same or similar to those enumerated in my said co-pending application and they mainly relate to provide more efficient baffling, regulating and diffusing of the air inflow, insuring a gentle air current, preventing dust, dirt or sound to have egress into the space to be ventilated and providing ventilators which are adapted to windows and particularly to windows or other parts of moving vehicles, like automobiles.

Other objects of this invention include the provision of a novel, baffling and diffusing passage through ventilators which also will adapt said ventilator to shed and direct the dirt, dust, water, rain, snow, etc. reaching the same in an automatic manner in downward and outward directions; of providing means to guide the air in a predetermined manner into or out of the space served by the ventilator and to provide a closed ventilator unit which may be easily removed for inspecting, repairing and cleaning.

Other objects of this invention will be apparent as the specification of the same proceeds.

In the drawings forming a part of this specification and accompanying the same:

Fig. 1 is a fragmentary, sectional, perspective view showing my novel ventilator passages as applied to an ordinary window.

Fig. 2 is a front elevation of the structure forming such passages, portions of the same being broken away;

Fig. 3 is a diagram illustrating the application of such passages to an automobile hood;

Fig. 4 illustrates in a diagrammatic manner the combination of my novel air passage structure with hinged shutter vanes, while

Fig. 5 is a fragmentary, sectional, perspective view showing my novel air passages in combination with a hinged box-like air deflector placed in front thereof;

Fig. 6 is a diagram showing such a deflector with hinged auxiliary vanes thereon;

Fig. 7 is a semi-diagrammatic fragmentary section showing an independent closed ventilator unit embodying my invention and being adapted to be removed or replaced in an efficient and easy manner.

Fig. 8 is a partly sectional front elevation showing my invention applied to a ventilator unit adapted to be secured in an automobile or a similar vehicle, while

Fig. 9 is a sectional plan thereof, the section being taken on the line 9—9 of Fig. 8, and

Fig. 10 is another enlarged sectional elevation of the structure of Fig. 8, the section being taken on the line 10—10, and the figure also showing fragments of an automobile window to which this ventilator is applied;

Fig. 11 is a diagram showing a novel construction for my air deflecting and guiding vanes, used in certain forms of my ventilator;

Figs. 12 and 13 are a diagrammatic plan and a sectional elevation, respectively, of a combination ventilator; while

Fig. 14 is a diagram of a sliding regulator.

Referring now to the drawings more closely by characters of reference, in Fig. 1 is shown the lower end of a window of usual building construction having the sill 20 and the side frame 21. The lower end of a sash 22 sliding in said frame is also shown with a portion of its glass window pane 23, as will be understood. My novel ventilator is secured across the lower end of the window opening 24, and it is generally indicated by the numeral 25.

As will be seen by inspecting Fig. 1, my novel ventilator is composed of S shaped, elongated, sheet metal units 26 which are set in parallelism with one another, each such unit being composed of an outer plate 27, an inner plate 28, a bridge or cross plate 29, connecting the respective upper and lower edges of the outer and inner plates 27 and 28, and two opposingly turned flanges 30 and 31 at the upper and lower ends of said S shaped unit 26. The outer and inner plates 27 and 28 are preferably vertical in position, while the cross plate 29 and the upper flange 30 are inclined in downward and outward directions, and the lower flange 31 is inclined in a downward and inward direction, in relation to the window sash 22, but it being understood that the ventilator units 26 are on the outside of the window and its sash 22.

A plurality of such S shaped units 26 are provided on the outside of the window, the topmost of them terminating in an upward flange 32 having a resilient yielding sealing means 33 incorporated thereon, being preferably in the form of a strip of rubber and engaging the sash 22 sealing the same in all of its positions but permitting its upward or downward movements, as will be understood, and as has been more fully explained in my co-pending application. The lowermost unit 26a of my ventilator structure, preferably ends with its cross plate 29a and is

continued in an outwardly directed flange **34** which lays on and may be secured to the window sill **20**.

The individual S shaped units **26** of my device may be secured at their ends engaging the two window frames **21** by any suitable means, as will be understood by those versed in this art, and as also has been explained more in detail in my co-pending application in connection with the ventilators there shown.

It will be seen that my S shaped sheet metal units with their cross plates and their overlapping flanges will provide S shaped elongated passages generally indicated by the numeral **35** for the air from the outside to the inside of the window, as shown by the arrows **36**, and that the air current will be dampened, made gentle, and highly diffused by the plurality of such passages provided by my device and that the dirt, dust, water, snow, etc. in said air current, or reaching my ventilator units in any other manner, will be prevented from entering the inside of the building, but will be deposited on the cross plates and flanges in my device and will ultimately be caused to slide or move outwardly and downwardly on the cross plates **29**. It will be understood that the flanges **30** and **31** may be made to overlap each other to a desired degree.

Finally, I preferably provide an increasingly larger passage along the arrows **36**, as has been explained hereinbefore, by making the distances between the lower edges of the flanges **31** and the bridge plates **29** thereunder, then between the free edges of the flanges **30** and **31**, and finally between each upper flange **30** and the bridge plate **29** thereabove, respectively, larger and larger. The air pressed from the outside to the inside, as by a catch device on a moving vehicle, will thereby be forced upwardly and inwardly, depositing its foreign matter on the plates and in the corners forming traps, and the speed of the air will be gradually lessened so that it will be delivered to the inside in a gentle highly diffused manner.

In Fig. 2 a front elevation of a plurality of S shaped units **26** proper is shown, portions of the structure being broken away since the height of the S shaped elements and their parts is usually small as compared to the usual length of such a ventilator and it is indicated in said Fig. 2 that the units **26** are secured together in a left hand and right hand end systems of the device generally indicated by the numerals **37** and **38**, the outer ends of said two systems being secured together and being received in a movable manner in heads secured at the two sides of a window frame so that the whole device may be lengthened or shortened in a telescopical manner to the width of the window in question, as has been more fully explained in my co-pending application, and will be understood by those versed in this art. The inner termination of the right hand system of the two telescopic units is indicated by the numeral **37***a*, while the similar termination of the left hand units is indicated by the numeral **38***a*.

In Fig. 4 my S shaped ventilator units are shown as built across an opening **43** in a wall of the device to be ventilated, like an automobile, and a plurality of vanes **44** is provided in combination therewith in the inside of the device to be ventilated, said vanes **44** being hinged as at **45** and being interconnected by a hinged link **46**, the upward or downward movement of which will cause said vanes to open or close and thereby permit a desired degree of ventilation and air current, as will be understood. My experience has been that my S shaped air passages in combination with such hinged shutter vanes will provide an exceptionally gentle and easily regulatable ventilation for an automobile or other device or building.

In Fig. 5 a unit **47** of my novel S shaped air passages is shown combined with an inclined single outer deflector or vane **48** having upper and lower sealing sides **49** and **50**.

This form of my device as most of the other ones, is particularly designed for automobiles and the one shown in Fig. 5 may be built anywhere into the wall of the body of the automobile, like over the door, the broader side or opening **51** of the box formed by the plates **48**, **49** and **50** being turned in the direction of the motion of the automobile thereby catching and forcing the air into said box, the air afterwards entering through the passages of the member **47** into the interior of the car. It will be seen that broadly speaking, my device, like the one described in connection with Fig. 4 and like many of the later ones, and like some of them shown in my earlier mentioned co-pending application, is composed of two main units, one being designed to guide the air to a second unit which is to diffuse and lead the air into the space to be ventilated, the first one may be generally called the air guide of my device, and the second one the diffusing and resistance member of my device, the first one in the embodiment of Fig. 5 being represented by the inclined plate **48** and its associated parts, while the second one is represented by the S shaped passages **47**.

In Fig. 6 I diagrammatically illustrate a further improvement on the same basic idea of my device having novel catch and guide means for the air which lead the air to a so called resistance device and force it therethrough, the whole procedure resulting in a gentle, diffused, clean stream of air.

In the device of Fig. 6, the diffusing or resistance member is indicated at **52** and preferably may embody therein the S shaped passages described hereinbefore, while the air catch and guide is in the form of an inclined plate **53**, the open side of the same being preferably turned in the direction of the motion of the car or other vehicle, as indicated by arrow **53***a*, so that a large volume of air will be forced underneath said large single catch or guide vane **53**. In this modification said vane further shows additional similar vanes or deflectors **54** in an inclined position secured on its inner side, said deflectors **54** distributing, guiding and forcing the air through the resistance and diffusing device **52**. Both the main guide vane **53** and the smaller deflectors or vanes **54** on the inside thereof may be made stationary and secured in favorable inclined positions, or they may have pivots at their secured edges, as indicated at **55** and **56**, respectively.

It is also preferred to provide spring means around the pivots **56** having the tendency to allow the vanes **54** to be forced backwards towards the main inclined plate **53** according to the pressure of the inrushing air. Finally, the vanes **54** obviously will be made narrower and narrower as they approach the pivot **55** of the main plate **53**.

In Fig. 7, a removable ventilator is shown, generally indicated by the numeral **57**, being in the form of an elongated box open to the outside at

one of its long sides, as at 58, while the other opposite similar side 59 turned towards the inside of the space to be ventilated, like the interior of an automobile, said box having a system 60 of the S shaped passages described hereinbefore, embodied therein. The box shaped ventilator has a closed top 61 and closed bottom 62, and the two lateral ends of it are also closed, fitting comparatively tightly into the opening 63 in the wall of the device to be ventilated. Spring means 64 and 65 may be secured to the top and the bottom of said opening 63, and when the box 57 is pushed between them, the same is kept there in a secured and sealed, but still resilient and removable manner. It is obvious that this device will guide the air into the interior in the manner described hereinbefore, while the dirt, moisture, and air will be depositcd in the S shaped passages and then shed outwardly. In case of need, the whole device may easily be removed from between the springs 64 and 65, inspected, cleaned or repaired and then snapped back into its place with equal facility.

In Figs. 8 to 10 I show another embodiment of my improved ventilator, which generally follows the lines of some of the embodiments described in my earlier application mentioned above, and is composed of a central box 66 having the open ends 67 and 68, closed top and bottom, an open front closed by the grille work 69, and an open rear or inner side 70. The box is housed in two heads 71 and 72 which show flanges 73 and in this embodiment screw means are employed to secure the whole device in its place like over the door, or window of an automobile through the openings 74 in the manner obvious from the drawings, and described in full detail in my said co-pending application. The grille 69 is preferably inclined, as shown, providing a box which is narrower at one end and wider at the other, and said box shows the mentioned resistance and diffusing member 75 embodied adjacent to its inner open side 70, being composed of the S shaped plate units and passages described hereinbefore. In front of said resistance unit 75, a plurality of hinged guide vanes or deflectors 76 are provided hingedly secured in the top 77 and bottom 78 of the box 66, as at 79 and 80. Each vane 76 may carry a pin 81 at its lower end whereby it is hingedly secured into a link rod 82. An arm 83 may be secured to one of said vanes having a screw-threaded pin 84 projecting downwardly therefrom and playing in a curved slot 85 in the bottom 78. It is obvious that by this mechanism the vanes 76 may be set to any desired angle or inclination in relation to the unit 75, and in certain inclined position thereof they will guide and force the air through said unit into the inside of the vehicle, while in the opposite positions of the same, they will act to exhaust the air from the inside. Vanes 76 are preferably made with increasing widths towards the wider end of the box 66, and if the car is moving in the direction of the decreasing vanes 76, arrow 86, each succeeding vane will have a chance to catch some of the air and guide it to the unit 75.

The preferred form of the vanes 76 is shown in the sectional diagram of Fig. 11, and as there indicated, the outer end 90 is wider than the inner end 91 and the two sides 92 and 93 are formed with curved outlines connecting said ends, one of said curves being concave, as at 92, and the other being convex, as at 93, the concave surface, according to my experience, acting as a deflector on the air, while the convex surface will exert a suction thereon.

In Fig. 3 I show in a diagrammatic manner, the application of my S shaped ventilator units in a hood of an automobile to provide the so-called cowl ventilation, said S shaped units 26 being secured together in an upwardly and downwardly movable system or box 40 engaging a respective element 41 below the wind-shield of the automobile and being movably sealed thereagainst by rubber sealing means 42 so as to provide more or less ventilation for the space at the driver's seat according to the degree the box 40 is raised or lowered, the air being introduced as indicated by arrows 40*a*.

In Figs. 12 and 13 I show a diagrammatic plan and cross-sectional elevation of the combination of a guide unit and resistance unit for my ventilator. The ventilator is a box-like structure 100, closed on all sides except the inner side 101, opening into the automobile or other object to be ventilated. Said open side 101 has built thereacross a resistance and diffusing unit 102 which may be of any construction, but preferably showing the S shaped baffles and passages described hereinbefore. The projecting part 103 of the box 100 may have openings 104 in its bottom and top parts having pivoted vanes 105 inserted therein which may be set at an inclination to the respective side of the box and so catch the air and guide it into said box and to the resistance unit 102, as will be obvious from the earlier explanations and from inspecting the diagram of Fig. 12. By setting said vanes with a reverse inclination to the side of the box, the same will act as suction means, for drawing the air from the inside of the automobile instead of guiding the outside air thereinto. In the diagram of Fig. 13, additional vanes 106 are indicated in appropriate openings in the vertical front side 107 of the box 100, said additional vanes 106 being omitted from the showing in Fig. 12 or being completely closed and their action being identical to those of the top and bottom vanes 105.

In Fig. 14 I show a sliding regulator applied to my baffle system in a sectional diagram. In this diagram the numeral 26 again represents the system of S shaped baffles and passages as described hereinbefore, in front thereof a sliding plate 120 may be employed, its guides 121 being indicated in a diagrammatic manner, said plate having open portions 122 and closed parts 123 in horizontal alternating sections, as will be understood. The regulator 120 is shown in the diagram as fully open and in case the same is pushed upwardly as indicated by the arrow 124, its closed portion 123 will gradually reduce the free area of the entrance to the passages 125 between the baffles in the system 26 and so reduce the air admitted through the same until finally said passages may be entirely closed.

I also want to again refer to the form of my device shown in Figs. 1 and 2 and remark that in some cases the baffle system, there shown and described in the specification, may conveniently be suspended instead of being secured only at the bottom thereof. In such cases appropriate screws with enlarged heads are provided in a suitable stationary object above the ventilator and a slot 34*a* may be provided at each end of the baffle system 25 and in the top thereof, as shown in Fig. 1, said slot 34*a* having a larger circular portion and a narrower elongated part pointing oppositely from the two ends towards the center of the ventilator. When it is desired to suspend the

ventilator the same will be telescopically extended to the right length, then the two circular larger portions of the slots **34***a* will be passed over the heads of the screws provided for the suspension of the ventilator, whereupon the same will be further extended, the stems of the screws entering into the narrow portion of the slots **34***a* so that the ventilator will be prevented from freeing itself of the screws on account of the large heads thereof engaging the margins of said narrow slots. In one word, my ventilator with the added slots **34***a* in its top will be adapted to be suspended through a bayonet locking action when telescopically extended.

In practice, I have found that the form of my invention, illustrated in the drawings and referred to in the above description, as the preferred embodiment, is the most efficient and practical; yet realizing that the conditions concurrent with the adoption of my device will necessarily vary, I desire to emphasize the fact that various changes in details of construction, proportion and arrangement of parts may be resorted to, when required, without sacrificing any of the advantages of my invention, as set forth and defined in the appended claims.

What I claim as new, is:

1. In a ventilator, a first plurality of outer plates substantially in registering position but spaced apart from one another, a second plurality of similar spaced apart registering individual inner plates; cross plates connecting pairs of adjacent individual plates in said two pluralities, and an inwardly turned lateral extension plate at each free end of each inner and outer plate in each of said pairs, said extension reaching to a part of the distance between said outer and inner plates, the respective inner and outer plates in each of said pairs, being in staggered relation to one another, and an inclined guide and deflector vane in front of said plurality of outer plates adapted to impress the moving air current thereinto, said vane being adjustable as to its inclination.

2. In a ventilator, a system of openings and air passages, and an inclined deflector plate in front of said system, having vanes at its side turned towards said system of passages, said vanes being inclined to said deflector plate.

3. In a ventilator, a system of openings and air passages, and an inclined deflector plate in front of said system, having vanes at its side turned towards said system of passages, said vanes being inclined to said deflector plate, said deflector plate being adjustable as to its inclination.

4. In a ventilator, a system of openings and air passages, and an inclined deflector plate in front of said system, having vanes at its side turned towards said system of passages, said vanes being inclined to said deflector plate, and said vanes being adjustable as to their inclination to said deflector plate.

5. In a ventilator, a means to provide system of openings and air passages, and an inclined deflector plate in front of said system, having vanes at its side turned towards said system of passages, said vanes being inclined to said deflector plate, said vanes being adjustable as to their inclination to said deflector plate, and yielding automatic means to normally open said vanes but allow their closing on said inclined plate upon an increase of the air pressure on them.

6. In a ventilator, a column of a plurality of superposed angular generally S-shaped members, each member being composed of an outer plate, an inner plate, a bridge plate connecting the lower end of the inner plate with the upper end of the respective outer plate, an upper flange plate projecting towards the center of the column from the upper end of the inner plate, a lower flange plate projecting towards the center of the column from the lower end of the outer plate, said bridge plates and said upper flange plates forming identical acute angles with the center plane of said column, and said lower flange plates forming identical acute angles with said center plane, the inclination of said lower flange plates to said center plane being opposite to the inclination of said upper flange plates and said bridge plates in relation to said center plane, the adjacent bridge plates, flange plates and the free ends of said flange plates being spaced apart from one another and from the respective adjacent plates, thereby forming a plurality of tortuous but free passages for the air between the interlocking neighboring portions of said members.

7. In a ventilator as set forth in claim 6, the free ends of said upper flange plates being bent double upon said plates and being spaced apart therefrom.

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