T. M. BROWN.

VENTILATOR.

APPLICATION FILED AUG. 19, 1920.

1,400,860.

Patented Dec. 20, 1921.

2 SHEETS—SHEET 1.

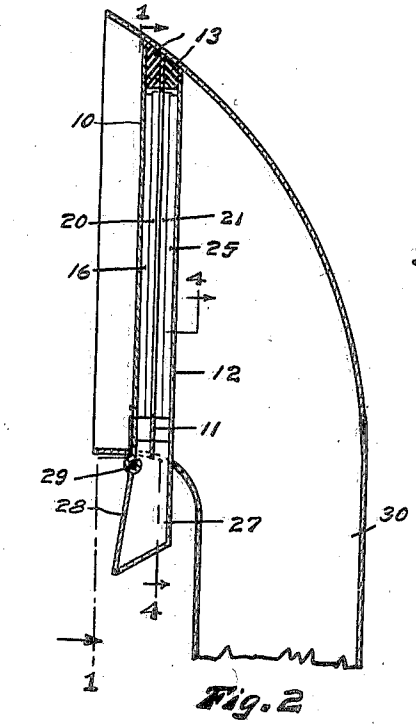


Fig. 2

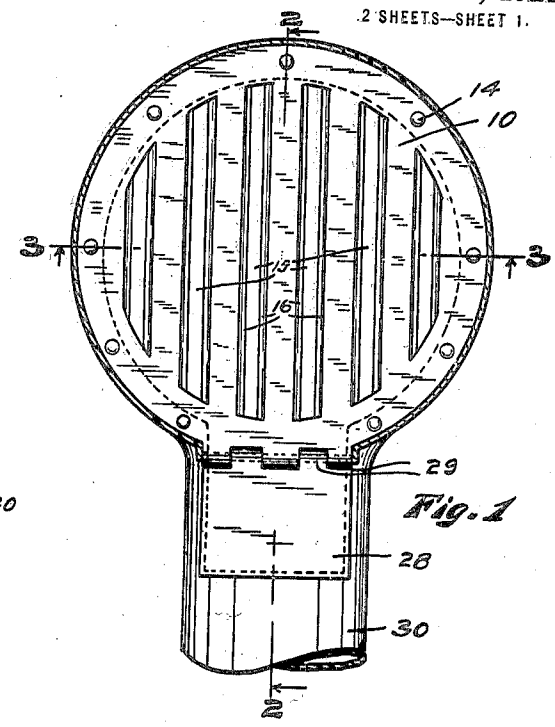


Fig. 1

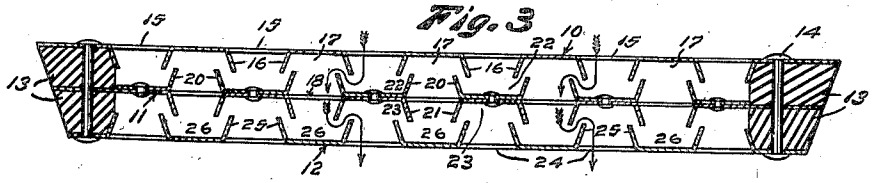


Fig. 3

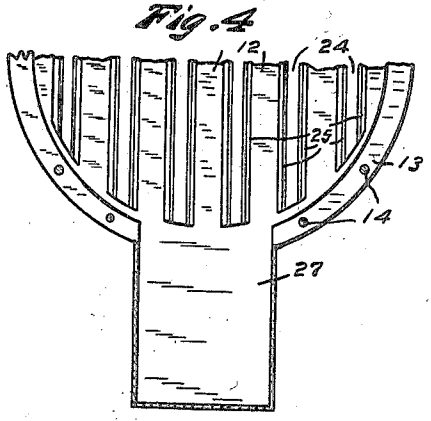


Fig. 4

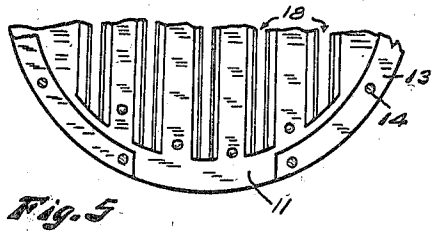


Fig. 5

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2 SHEETS—SHEET 2.

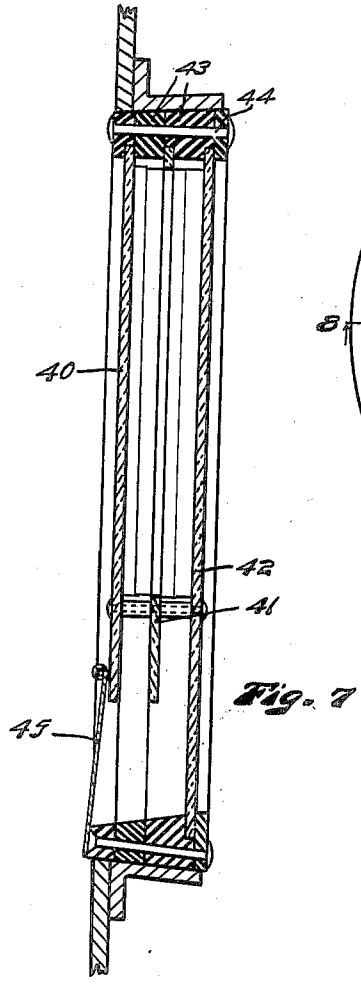


Fig. 7

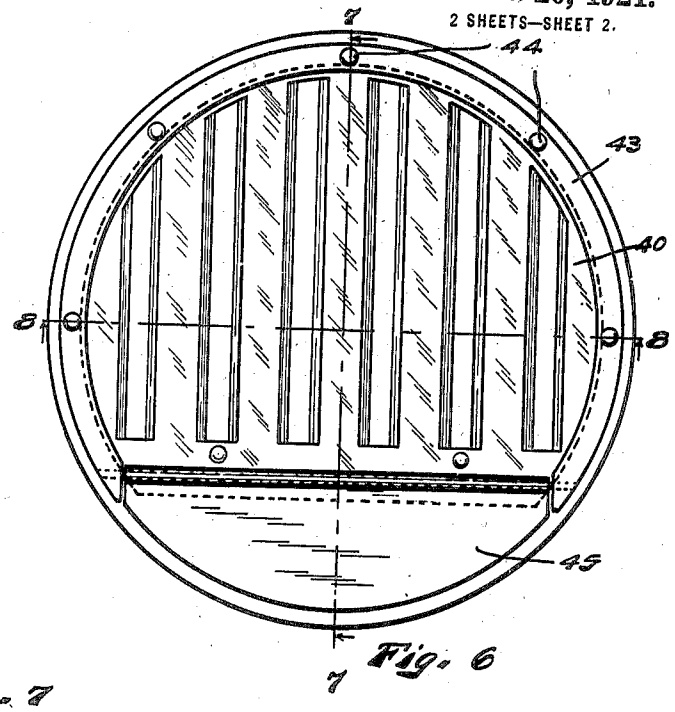


Fig. 6

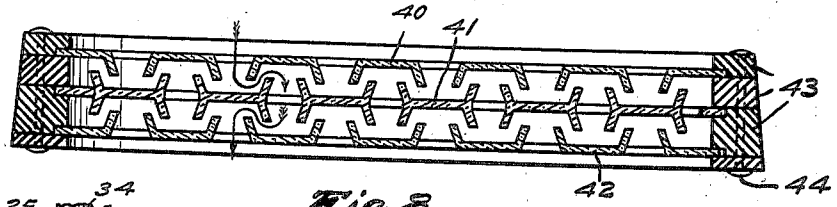


Fig. 8

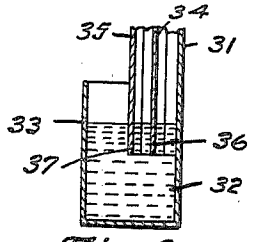


Fig. 9

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VENTILATOR.

1,400,860. Specification of Letters Patent. Patented Dec. 20, 1921.

Application filed August 19, 1920. Serial No. 404,504.

To all whom it may concern:

Be it known that I, THEOPHILUS M. BROWN, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Ventilators, of which the following is a specification.

My invention relates to improvements in ventilators that are so constructed as to permit the passage of air but to prevent the passage of water therethrough, and the object of my improvement is to provide a ventilator of this type that is particularly well adapted to be installed in places that are subjected to contact with water in the form of rain, spray or the occasional splashing of waves as, for instance, in ventilator cowls, port openings, ventilator scoops and outboard doors of ships where it is desired to permit the passage of air, but to exclude all water.

Another object is to provide ventilator mechanism that may be made up in various shapes, forms and designs to meet different requirements without departing from the principle of construction of the said ventilator mechanism.

A still further object is to provide ventilator mechanism that is simple in construction, efficient in operation, not expensive to build, and that may, if desired, be made of glass so that it will permit the passage of light therethrough.

A further and more specific object resides in the provision of devices at the bottom side of each ventilator to permit the outlet or discharge therefrom of water that strikes upon the ventilator, but to prevent air from being deflected downwardly and out through the water exit.

With the above and other objects in view, as will become apparent as the description proceeds, the invention consists in the novel construction, adaptation and combination of parts of a waterproof ventilator, as will be more clearly described and claimed.

In the accompanying drawings, Figure 1 is a view partly in elevation and partly in cross-section substantially on a broken line 1—1 of Fig. 2, of a ship's ventilator cowl in which one of my ventilators is installed; Fig. 2 is a view in vertical section of the same substantially on a broken line 2—2 of Fig. 1; Fig. 3 is an enlarged view in cross-section substantially on broken line 3—3 of Fig. 1; Fig. 4 is a fragmentary sectional view substantially on a broken line 4—4 of Fig. 2, showing the rear plate of the ventilator; Fig. 5 is a detached fragmentary view in elevation showing the bottom portion of the medial plate of the ventilator; Fig. 6 is a view in front elevation of one of my ventilators that is designed for use in a port hole or door; Fig. 7 is an enlarged view in cross-section substantially on a broken line 7—7 of Fig. 6; Fig. 8 is an enlarged view in cross-section substantially on a broken line 8—8 of Fig. 6; and Fig. 9 is a fragmentary view in cross-section of a modified form of water exit and air seal that may be used at the bottom of ventilators of this type.

Like reference numerals designate like parts throughout the several views.

Referring to Figs. 1 to 5, inclusive, of the drawings, the numerals 10, 11 and 12 designate three substantially circular plates that are supported in spaced-apart parallel relation by spacing rings 13, and that are secured together by bolts or rivets 14. The outer plate 10 is provided with a plurality of vertical slots 15 having relatively narrow convergent flanges 16 that project inwardly from each edge thereof toward the medial plate 11, as shown in Fig. 3, and that form troughs 17 of flaring cross-sectional shape on the inside of said outer plate 10.

The medial plate 11 is provided with a plurality of vertically arranged slots 18 that are offset with respect to the slots 15 and that have relatively narrow convergent sets of side flanges 20 and 21 respectively projecting in opposite directions from the said plate, the flanges 20 being directed toward the troughs 17. The flanges 20 form troughs 22 that are opposite the slots 15 while the flanges 21 form troughs 23 on the opposite side of the plate 11.

The innermost plate 12, which is substantially a duplicate of the plate 10, is provided with vertical slots 24 that are offset with respect to the slots 18 in the medial plate and have relatively narrow convergent flanges 25 at each edge thereof that project toward the troughs 23 of the plate 11. The flanges 25 form troughs 26 that are opposite the slots 18 in the plate 11.

The form of construction shown in Fig. 3 illustrates the flanges 21 of the center plate

11 integral with such plate, while the flanges 23 are formed by riveting separate troughs to the plate 11.

The flanges 16 and 20 are of a width equal to substantially one-half the distance between the plates 10 and 11 while the flanges 21 and 25 are of a width equal to substantially one-half the distance between the plates 11 and 12 so that the flanges 16 and 20 terminate in substantially the same plane and the flanges 21 and 25 terminate in substantially the same plane.

The slots in each of the plates 10, 11 and 12 are preferably of substantially the same width as the solid material between such slots, and the flanges 16, 20, 21 and 25 are all inclined at other than right angles to their respective plates and are offset with respect to each other so that passageways are formed through which air may pass, as indicated by the arrows on Fig. 3.

The spacing rings 13 are cut away at the bottom (see Figs. 4 and 5), to leave water exit openings, and the inner plate 12 is preferably provided with a downwardly projecting water outlet trap 27 for directing water outwardly, the front side of the said water trap being closed by a swinging door 28 that is hinged, as at 29, to the outer plate 10. The door 28 is ordinarily held by gravity in a closed position and prevents the air that starts to enter through the ventilator from being directed downwardly by the several troughs and outwardly through the water trap, but such door is not heavy enough to prevent the exit of water that may be directed downwardly into the water trap.

The ventilator shown in Figs. 1 to 5, inclusive, is particularly well adapted to be inserted in a ventilating cowl 30 of a ship, the bottom portion of the mouth of such cowl being cut away so that the water trap 28 may project downwardly therethrough, as more clearly shown in Fig. 2.

When water strikes the ventilator and enters through the slots in the outer plate, the greater part of such water will be caught by the troughs in the medial plate and directed downwardly thereby and any of such water that finds its way through the slots in the medial plate will be caught within the troughs in the innermost plate and directed downwardly by such troughs.

Air may pass through the ventilator freely by following the course indicated by the arrows in Fig. 3.

The ventilator shown in the drawings is reversible so far as its water-excluding and air-conducting properties are concerned, and such ventilator may be used in any position where the incline of the same is sufficient to cause the water to flow lengthwise in the troughs and is not such as to cause the water to flow over the edges of the flanges.

If desired, more than three of the slotted and flanged plates may be used, but it has been found in practice that three of the plates arranged as shown are all that are necessary for ordinary working conditions and that even two of such plates will form a ventilator that will exclude water very efficiently.

In Fig. 9 I have shown a fragment of a ventilator which is identical with the ventilator shown in Figs. 1 to 5, inclusive, except that the rear plate 31 thereof is provided with a water trap 32 having a front side 33 that extends upwardly and forms a water receptacle, and the medial plate 34 and front plate 35 are provided with plates or extensions 36 and 37, respectively, that project downwardly into the water trap 32 so that the water that is normally retained in such trap forms a seal to prevent the escape of air through such water trap.

Figs. 6, 7 and 8 show one of my ventilators that is constructed of glass and that has the water trap formed within the circumference of a circular ventilator thereby rendering the same particularly well-adapted for use in port holes, wind scoops and outboard doors of ships.

In the construction shown in Figs. 6, 7 and 8, I use three plates, 40, 41 and 42, corresponding to the plates 10, 11 and 12, and provided with similarly shaped and similarly arranged slots and flanges. The plates 40, 41 and 42 are supported in spaced apart relation by circumferentially arranged spacing rings 43 that are secured together by bolts or rivets 44.

The lower circumferential portions of the plates 41 and 42 are cut away, as shown in Figs. 6 and 7, and the lowermost portions of the rings 43 are shaped to form a water trap that is arranged to be closed by a hinged door 45 corresponding to the door 28.

The operation of the ventilator shown in Figs. 6, 7 and 8 is substantially the same as the operation of the ventilator shown in Figs. 1 to 5, inclusive, and will be understood without further description.

Where the ventilator plates are molded from glass the ventilator may also serve as a means for admitting light. This ventilator is particularly useful on ships for the purposes described, but obviously it may be put to other uses if desired.

From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation of this ventilator will be readily apparent, but while I have described the principle of operation of the invention together with the device which I now consider to be the best embodiment thereof, it will be understood that the device shown is merely illustrative and that such changes may be resorted to as are within the scope of the following claims.

What I claim, is—

1. A ventilator comprising three substantially circular plates in parallel spaced relation, the outer plates being formed with a plurality of vertical slots having marginal flanges projecting inwardly toward the inner plate, said inner plate being provided with a plurality of vertically arranged slots symmetrically offset with respect to the slots of said outer plates, the slots of the inner plate having marginal flanges extending on opposite sides of the inner plate toward the outer plates and having their outer extremities at each side of the respective slots in a vertical line transversely of the plates.

2. A ventilator comprising three spaced parallel plates each formed with a plurality of vertical slots, the outermost plates having inwardly directed flanges at the edges of said slots, the inner plate having flanges upon both sides of the plate at the side edges of the slots therein.

3. A ventilator comprising three spaced parallel plates, each having a plurality of slots provided therein, flanges at the edges of each of said slots and projecting from each of said plates toward the next adjacent plates in directions that are inclined toward said slots to form troughs with divergent sides between said slots, the slots in each plate being opposite the troughs in the plates next adjacent thereto, the oppositely disposed adjacent flanges terminating in substantially the same plane parallel to said plates.

4. A ventilator comprising three spaced parallel plates each having slots, flanges at the edges of said slots and projecting from each of said plates toward the next adjacent plates in directions inclined toward said slots, the said flanges forming troughs between said slots, and the troughs in each plate being opposite the slots in the plates next adjacent thereto, the oppositely disposed adjacent flanges terminating in substantially the same plane parallel to said plates, a water trap formed at the bottom of said ventilator, and a means to prevent the escape of air through said water trap.

5. A ventilator comprising three spaced apart parallel plates each having a plurality of slots therein, the slots in the medial one of said plates being offset with respect to the slots in the two outside plates, flanges at the edges of each of said slots, the said flanges projecting from the inner sides of both of said outer plates toward said medial plate and from both sides of said medial plate toward said outer plates, respectively, and said flanges all being inclined toward their adjacent slots at less than right angles with respect to the plane of their respective plates and forming troughs of divergent cross-sectional shape, the troughs of each plate being opposite the slots of each adjacent plate.

6. A ventilator comprising three spaced apart parallel plates each having a plurality of spaced parallel slots therein the width of the said slots being substantially equal to the distance between adjacent edges of said slots, flanges at the edges of each of said slots, the said flanges projecting from the inner side of each of said outside plates toward the medial plate, and from both sides of said medial plate toward the outside plates, respectively, and said flanges all being inclined toward their adjacent slots at less than right angles with respect to the plane of their respective plates and forming troughs with outwardly flaring sides, the troughs of each plate being opposite the flanges of each adjacent plate, a water trap at the bottom of said ventilator, and a swinging door for closing the front side of said water trap.

7. A ventilator comprising three substantially circular plates in parallel spaced relation, the outer plates being formed with a plurality of vertical slots having converging marginal flanges projecting inwardly toward the inner plate, said inner plate being provided with a plurality of vertically arranged slots offset with respect to the slots of said outer plates, said slots of the inner plate having converging marginal flanges extending on opposite sides of the inner plate toward the outer plates and having their outer extremities at each side of the respective slots in a vertical line transversely of the plates.

8. A ventilator comprising three parallel plates arranged in spaced relation within the ventilator, the outer plates being formed with a plurality of vertical slots having converging marginal flanges projecting inwardly toward the inner plate, said inner plate being provided with a plurality of vertically arranged slots offset with respect to the slots of said outer plates, said slots of the inner plate having converging marginal flanges extending on opposite sides of the inner plate toward the outer plates and having their outer extremities at each side of the respective slots in a vertical line transversely of the plates, the oppositely disposed adjacent flanges of the inner and outer plates terminating in substantially the same plane parallel to said plates.

Seattle, Washington, July 29 1920.

THEOPHILUS M. BROWN.